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# FLOOD INSURANCE STUDY



**TOWNSHIP OF MONTCLAIR,  
NEW JERSEY  
ESSEX COUNTY**



AUGUST 4, 1987



**Federal Emergency Management Agency**

COMMUNITY NUMBER - 340188

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NOTICE TO  
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY  
TOWNSHIP OF MONTCLAIR, ESSEX COUNTY, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Township of Montclair, Essex County, New Jersey. This information will be used by the Township of Montclair to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study represent a revision of the original analyses prepared by McPhee, Smith & Rosenstein, Engineers, for the Federal Emergency Management Agency (FEMA), under Contract No. H-3723. The original work was completed in July 1975. The hydrologic and hydraulic analyses for the Third River, the Second River, and Nishuane Brook were revised by the New Jersey Department of Environmental Protection (NJDEP). This work was completed in May 1986.

1.3 Coordination

On October 10, 1975, a final Consultation and Coordination Officer's (CCO) meeting was held with representatives from FEMA, the township, NJDEP, and McPhee, Smith & Rosenstein. The purpose of the meeting was to review proposed flood elevations and boundaries and provide an opportunity for community officials and the public to become familiar with the results of the study. Coordination with the NJDEP was maintained by FEMA's representative for the State of New Jersey, the township, and local officials throughout the study in order to minimize all possible conflicts.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Montclair, Essex County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

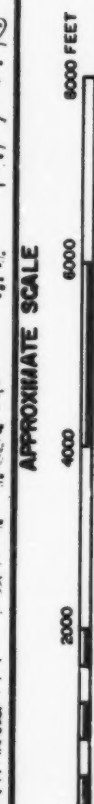
The following streams were studied by detailed methods: the Third River, for its entire length within the corporate limits; the Third River Tributary, for its entire length within the corporate limits; the Second River, from the downstream corporate limits to Godfrey Road; Nishuane Brook, from the downstream corporate limits to Elm Street; and Yantacaw Brook, from the downstream corporate limits to Club Road. Due to a more updated hydrologic and hydraulic analyses the following streams were revised: the Third River, for its entire length within the corporate limits; the Second River, from the downstream corporate limits upstream to Park Street; and Nishuane Brook, from the corporate limits upstream to Draper Terrace. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development.

### 2.2 Community Description

The Township of Montclair is located in the northeast portion of Essex County, approximately 4 miles north of Newark, in the northeast portion of New Jersey. The town consists of a strip of land 1.4 miles wide and 4.5 miles long. It is bordered by the Town of West Orange and the City of Orange to the south, the Borough of Verona and the Township of Cedar Grove to the west, the Township of Little Falls and the City of Clifton to the north, and the Town of Bloomfield and the Township of Glen Ridge Borough to the east. In 1974, the population of Montclair was 43,635, with a density of 7,095 persons per square mile.

The township was formerly a part of Newark, New Jersey, founded in 1660. From 1812 until it became a separate township in 1868, it was governed by the Town of Bloomfield. Montclair was primarily a quiet woodland and farm area. The first settlers obtained the land from the Indians by treaties and payments. Long called Cranetown, the present southern part of Montclair was named after Jasper Crane's son, who built the first dwelling. Dutch farmers came from Hackensack to the northern part of Montclair, which was named Speertown. Cranetown and Speertown, symbolized in the seal of Montclair by a crane and spear held by an Indian, were connected in the late eighteenth century by the old Speertown Road, now Valley Road. The Township of Montclair reflects the living habits brought here by newcomers of many nationalities. A surprising number of the original families remained through the years, with succeeding generations continuing to contribute to the life of the township.





VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MONTCLAIR, NJ  
(ESSEX CO.)

FIGURE 1

The floodplains in the township are predominantly residential, with a few industrial enterprises that are small in size and have minor influence on the economy of the township. Numerous city streets and rail lines cross the floodplain.

The land area of the township consists of approximately 2,376 residential acres, with 124 acres of commercial and industrial usage, 159 acres of public and semi-public land, 193 acres of parks and playground, 21 acres of parking plazas, 641 acres of streets and railroads, 331 acres of vacant land, and 98 acres of other land.

Montclair provides its commuting residents with varied and frequent transportation connections to New York, Newark, and intermediate, industrial centers. The Erie-Lackawanna Railroad has service from Montclair to Hoboken. Transport of New Jersey (Public Service) operates buses down Bloomfield Avenue to Penn Station in Newark. Another bus travels from Montclair Heights in Upper Montclair, down Valley Road, to Upper Montclair Center and Newark. De Camp Bus Lines operates buses to Jersey City and to New York City. Most of these transportation services are privately owned.

The Wanaque Reservoir is the prime source of water for Montclair. This is supplemented by two rock wells, which are 300 feet deep, with a combined capacity of 1.5 million gallons per day. Montclair sells water to a portion of Little Falls, to 90 percent of Cedar Grove, and to a small portion of Clifton.

The climate of the area is characteristic of the entire Middle Atlantic Seaboard. Marked changes of weather are frequent, particularly during the spring and fall. The winters are moderate, with moderate snowfall, and the summers are moderate, with hot, sultry, midsummer weather and frequent thunderstorms. The mean annual temperature in the community is 53.2 degrees Fahrenheit (°F). Rainfall in New Jersey follows a fairly consistent pattern from year to year, with most of the heaviest rainfalls recorded during the spring and summer months. Average precipitation for the Township of Montclair is 48 inches.

The soil is generally unstratified and stratified drift with fluvial deposits, underlain with bedrock varying from basalt and diabase traprock to gray and red sandstone and shale. Vegetation consists primarily of sycamore, red maple, black oak, and poplar trees.

Montclair lies in the Lower Passaic River Valley, which contains 192 square miles of the Passaic River Watershed, between Little Falls and Newark Bay. The elevation varies from 200 to 500 feet, with the higher elevations in the west.



### 2.3 Principal Flood Problems

Flooding along the streams within the township is mainly caused by backwater that is created by inadequate pipes, box culverts, and bridges clogged by deposits of silt and debris. Shallow, rocky streambeds and heavy brush cover on overbanks also limit effective flow areas. The floodplain development, including hydraulic structures affecting the study, and vegetation are illustrated by Figures 2 through 8.

The adjacent land area for the streams studied in detail is affected by heavy rainfall, with the exception of a few areas where the channel is relatively wide and the banks are well stabilized. There are several other areas in the township, which, although not adjacent to a body of water, experience flooding due to an inadequate storm water drainage system.

Montclair has sustained damages from past floods. The largest recorded floods occurred during May 1968, August and September 1971, and on February 2, 1973. Floodwaters caused disruption in traffic, inundation of streets, interruption of businesses, danger to life, and flooding of homes.

One of the earliest, reliable quantitative reports of heavy rainfall in New Jersey indicated a record of 15 inches on August 5, 1843; an estimated 4 to 5 inches in October 1869; 17.9 inches on September 21 through 23, 1882; and approximately 8 to 11 inches on September 17 through 21, 1938.

On August 13, 1955, Hurricane Connie passed over central Pennsylvania and into New Jersey, producing 8.10 inches of rainfall that caused severe damages. Tropical Storm Doria moved across New Jersey in August 1971, causing river stages to rise rapidly and produce flash flooding, especially in small streams and brooks. The heavy rainfall over northeastern New Jersey on September 12 through 14, 1971, combined with Tropical Storm Heidi moving north-northeast and produced severe flooding in Montclair. The most severe damages were caused by the flood of February 2, 1973.

### 2.4 Flood Protection Measures

The Memorial Park Retention Basin on the Second River was modified around 1950 to provide storage for floodwaters of approximately 357,000 cubic feet of floodwater. The date of construction of this facility is unknown.

In connection with an application by the Montclair Redevelopment Agency, Storch Engineers, in 1974, developed a plan for stream encroachment of



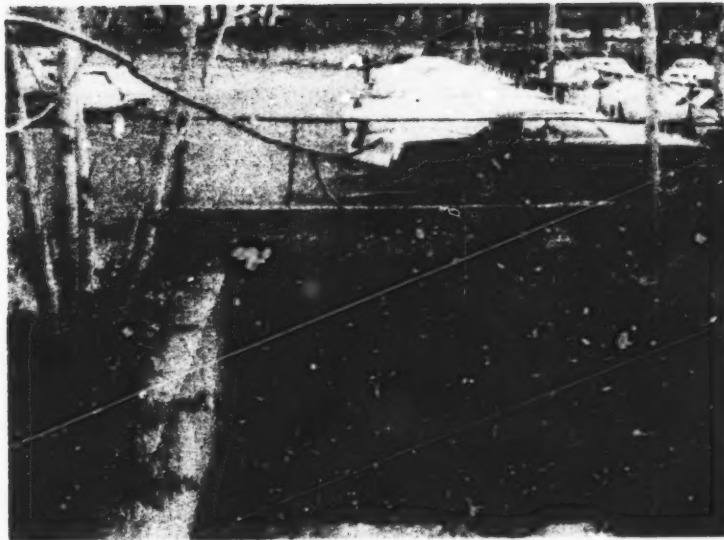


Figure 2. Second River Looking Downstream From Glen Ridge Avenue Towards Parking Lot (Undersized box culvert inhibits river flow and causes overland sheet flow when culvert capacity is exceeded.)

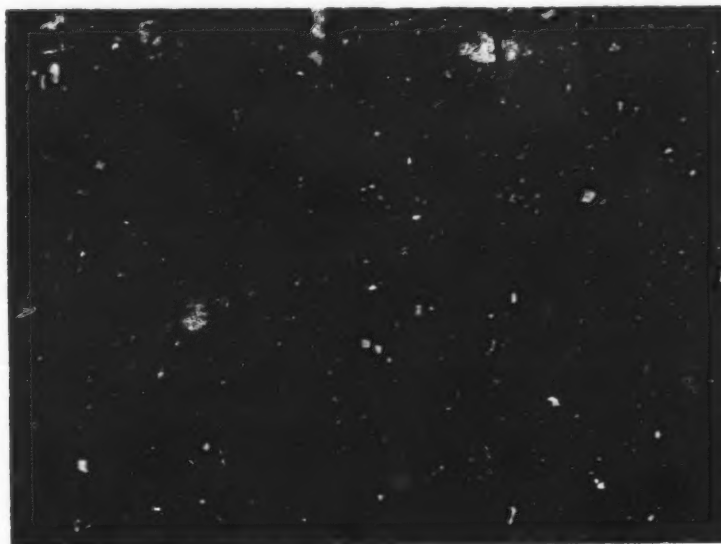


Figure 3. Second River Looking Downstream From Park Street Bridge (Stabilized channel banks, and clear, smooth overbanks tend to aid flow and minimize flood plain.)

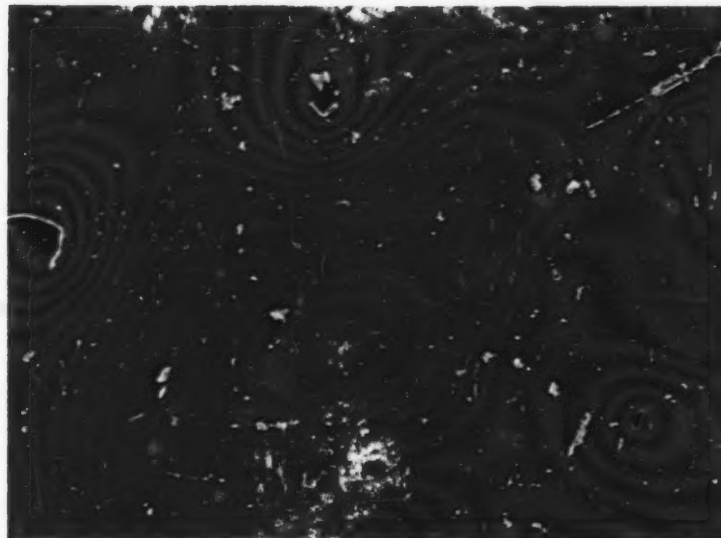


**Figure 4.** Second River Looking Upstream From Midland Avenue Bridge  
(Heavy brush and trees covering overbanks tend to obstruct flood waters.)



**Figure 5.** Second River Looking Downstream From Parkway Road Bridge  
(Rocky channel bottom and poor channel banks inhibit flood waters.)

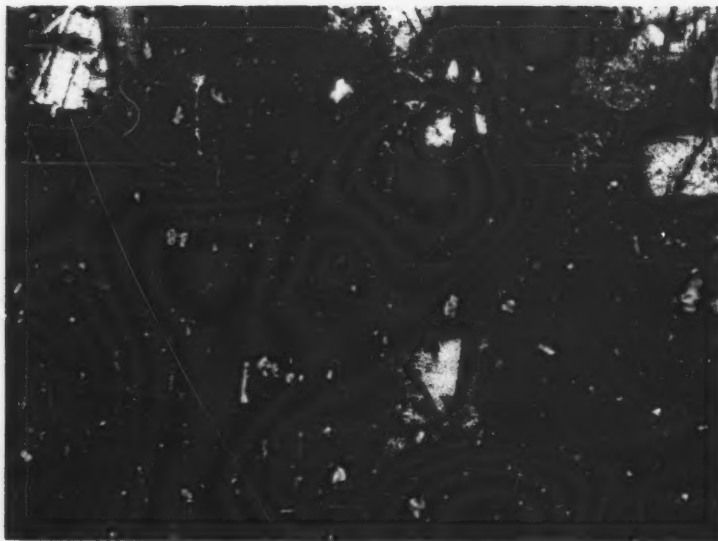


Figure 6. Second River Looking Upstream From Brookfield Road Bridge (Undersized channel, heavy brush, and trees in the channel and on overbanks severely inhibit river flow causing wide flood plain.)



Figure 7. Yantacaw Brook Looking Downstream At Woodmount Avenue Box Culvert (Undersized box culvert and abrupt contraction to culvert cause rapid rise in water-surface elevation and overland sheet flow.)



Figure 8. Yantacaw Brook Looking Downstream At Spillway. (Small opening between wooden planks and spillway severely inhibits river flow and causes the water-surface elevation to rise significantly upstream of the spillway.)

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the Second River in connection with the Lackawanna Plaza urban renewal project (Reference 1). The project consists of channel improvements between Grove Street and Bloomfield Avenue. The work would consist of realignment of the channel, construction of retaining walls, relocation of Glen Ridge Avenue, relocation of the railroad, and construction of a box culvert. Work on this project has not been initiated, and funds have not been appropriated. When completed, this project will alleviate the serious potential flooding areas between Bloomfield Avenue and a point approximately 300 feet upstream of Claremont Avenue.

### 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

#### 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Frequency-discharge data for the Third River were computed using the U. S. Geological Survey (USGS) Special Report 38 (Reference 2).

The frequency-discharge data for the Second River were obtained from the USGS and developed using log-Pearson Type III distribution, which required the use of the statistical analysis of discharge records covering a 28-year period at the gaging station operated by the USGS at Belleville, New Jersey.

Frequency-discharge data for Nishuane Brook were developed by correlation with the Second River, which has similar drainage basin characteristics, at Belleville, New Jersey. Discharges for small tributaries having a drainage area less than 1.0 square mile were computed by the Rational Method.

The USGS, in cooperation with the NJDEP, Division of Water Resources, developed a series of regional equations, which were applied to determine discharges for streams having a drainage area of more than 1.0 square mile (Reference 2). A comparison with this and the aforementioned method indicated differences in flood discharges of the same frequency of approximately 15 percent.

Discharges for Third River Tributary and Yantacaw Brook (having areas of less than or equal to 1 square mile) were determined using the rational method.

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

**TABLE 1 - SUMMARY OF DISCHARGES**

| <u>FLOODING SOURCE AND LOCATION</u> | <u>DRAINAGE AREA</u><br><u>(sq. miles)</u> | <u>PEAK DISCHARGES (cfs)</u> |                |                 |                 |
|-------------------------------------|--------------------------------------------|------------------------------|----------------|-----------------|-----------------|
|                                     |                                            | <u>10-YEAR</u>               | <u>50-YEAR</u> | <u>100-YEAR</u> | <u>500-YEAR</u> |
| THIRD RIVER                         |                                            |                              |                |                 |                 |
| At downstream corporate limits      | 3.0                                        | *                            | *              | 1,295.0         | *               |
| THIRD RIVER TRIBUTARY               |                                            |                              |                |                 |                 |
| At downstream corporate limits      | 1.0                                        | 415.0                        | 630.0          | 720.0           | 950.0           |
| SECOND RIVER                        |                                            |                              |                |                 |                 |
| At downstream corporate limits      | 2.5                                        | *                            | *              | 1,914.0         | *               |
| At Glen Ridge Avenue                | *                                          | *                            | *              | 1,454.0         | *               |
| NISHUANE BROOK                      |                                            |                              |                |                 |                 |
| At downstream corporate limits      | 1.2                                        | 480.0                        | 640.0          | 1,213.0         | 930.0           |
| YANTACAW BROOK                      |                                            |                              |                |                 |                 |
| At downstream corporate limits      | 0.5                                        | 275.0                        | 430.0          | 475.0           | 630.0           |

\*Not computed

### 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the backwater analysis for the streams studied by detailed methods were field surveyed and located at close intervals above and below bridges and culverts in order to compute the significant backwater effect of these structures in this highly urbanized area.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 3). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the streams studied by detailed methods were developed using the slope/area method.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection of the stream and floodplain areas. The channel "n" values for the Third River ranged from 0.037 to 0.042, and the overbank "n" values ranged from 0.081 to 0.120. The channel "n" values for the Second River ranged from 0.018 to 0.035, and the overbank "n" values ranged from 0.020 to 0.150. The channel "n" values for Mishuane Brook ranged from 0.020 to 0.030, and the overbank "n" values ranged from 0.060 to 0.100. The channel "n" values for Third River Tributary and Yantacaw Brook ranged from 0.015 to 0.045, and the overbank "n" values ranged from 0.070 to 0.150.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

#### **4.0 FLOODPLAIN MANAGEMENT APPLICATIONS**

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

##### **4.1 Floodplain Boundaries**

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,000 with a contour interval of 10 feet (Reference 4). For the revised portions of the Third River, the Second River, and Nushuane Brook, the 100-year boundaries were delineated using topographic maps at a scale of 1:2,400, with a contour interval of 5 feet (Reference 5).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

##### **4.2 Floodways**

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not



produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, floodways having no more than a 0.2-foot surcharge have been delineated for this study. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 9.

## **5.0 INSURANCE APPLICATION**

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

### **Zone A**

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

### **Zone AE**

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

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| FLOODING SOURCE                  |                     | FLOODWAY        |                                     |                                          | BASE FLOOD<br>WATER SURFACE ELEVATION |                                    |                  |          |
|----------------------------------|---------------------|-----------------|-------------------------------------|------------------------------------------|---------------------------------------|------------------------------------|------------------|----------|
| CROSS SECTION                    | DISTANCE            | WIDTH<br>(FEET) | SECTION<br>AREA<br>(SQUARE<br>FEET) | MEAN<br>VELOCITY<br>(FEET PER<br>SECOND) | REGULATORY                            | WITHOUT<br>FLOODWAY<br>(FEET NGVD) | WITH<br>FLOODWAY | INCREASE |
| <b>Third River</b>               |                     |                 |                                     |                                          |                                       |                                    |                  |          |
| A                                | 51,580 <sup>1</sup> | 239             | 1,116                               | 1.2                                      | 198.4                                 | 198.4                              | 198.5            | 0.1      |
| B                                | 53,380 <sup>1</sup> | 147             | 388                                 | 3.3                                      | 211.5                                 | 211.5                              | 211.7            | 0.2      |
| C                                | 54,670 <sup>1</sup> | 78              | 537                                 | 2.4                                      | 218.4                                 | 218.4                              | 218.6            | 0.2      |
| <b>Third River<br/>Tributary</b> |                     |                 |                                     |                                          |                                       |                                    |                  |          |
| A                                | 325 <sup>2</sup>    | 128             | 92                                  | 7.8                                      | 222.5                                 | 222.5                              | 222.6            | 0.1      |
| B                                | 1,295 <sup>2</sup>  | 158             | 281                                 | 2.6                                      | 249.1                                 | 249.1                              | 249.2            | 0.1      |
| C                                | 1,670 <sup>2</sup>  | 22              | 71                                  | 10.1                                     | 253.1                                 | 253.1                              | 253.1            | 0.0      |
| D                                | 2,370 <sup>2</sup>  | 18              | 66                                  | 10.9                                     | 277.4                                 | 277.4                              | 277.4            | 0.0      |
| E                                | 2,874 <sup>2</sup>  | 27              | 79                                  | 9.1                                      | 284.3                                 | 284.3                              | 284.4            | 0.1      |
| F                                | 3,550 <sup>2</sup>  | 36              | 57                                  | 8.4                                      | 304.9                                 | 304.9                              | 304.9            | 0.0      |
| G                                | 3,980 <sup>2</sup>  | 20              | 54                                  | 8.9                                      | 334.7                                 | 334.7                              | 334.9            | 0.2      |
| H                                | 4,621 <sup>2</sup>  | 102             | 198                                 | 1.2                                      | 359.0                                 | 359.0                              | 359.2            | 0.2      |
| I                                | 5,590 <sup>2</sup>  | 21              | 44                                  | 5.6                                      | 368.3                                 | 368.3                              | 368.4            | 0.1      |
| <b>Second River</b>              |                     |                 |                                     |                                          |                                       |                                    |                  |          |
| A                                | 23,385 <sup>1</sup> | 42              | 234                                 | 8.2                                      | 193.8                                 | 193.8                              | 193.8            | 0.0      |
| B                                | 23,740 <sup>1</sup> | 27              | 182                                 | 10.5                                     | 195.7                                 | 195.7                              | 195.8            | 0.1      |
| C                                | 23,950 <sup>1</sup> | 47              | 197                                 | 9.7                                      | 198.6                                 | 198.6                              | 198.8            | 0.2      |
| D                                | 24,670 <sup>1</sup> | 41              | 225                                 | 8.5                                      | 212.7                                 | 212.7                              | 212.7            | 0.0      |
| E                                | 25,205 <sup>1</sup> | 26              | 143                                 | 13.4                                     | 217.3                                 | 217.3                              | 217.3            | 0.0      |
| F                                | 26,055 <sup>1</sup> | 20              | 131                                 | 14.6                                     | 225.1                                 | 225.1                              | 225.1            | 0.0      |

<sup>1</sup>Feet above confluence with Passaic River

<sup>2</sup>Feet above confluence with Third River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWNSHIP OF MONTCLAIR, NJ**  
(ESSEX CO.)

**FLOODWAY DATA**

**THIRD RIVER- THIRD RIVER TRIBUTARY - SECOND RIVER**

| FLOODING SOURCE             |                       | FLOODWAY        |                                     |                                          | BASE FLOOD<br>WATER SURFACE ELEVATION |                                    |                  |          |
|-----------------------------|-----------------------|-----------------|-------------------------------------|------------------------------------------|---------------------------------------|------------------------------------|------------------|----------|
| CROSS SECTION               | DISTANCE <sup>1</sup> | WIDTH<br>(FEET) | SECTION<br>AREA<br>(SQUARE<br>FEET) | MEAN<br>VELOCITY<br>(FEET PER<br>SECOND) | REGULATORY                            | WITHOUT<br>FLOODWAY<br>(FEET NGVD) | WITH<br>FLOODWAY | INCREASE |
| Second River<br>(continued) |                       |                 |                                     |                                          |                                       |                                    |                  |          |
| G                           | 28,175                | 66              | 152                                 | 9.6                                      | 247.7                                 | 247.7                              | 247.7            | 0.0      |
| H                           | 29,149                | 14              | 97                                  | 14.9                                     | 255.5                                 | 255.5                              | 255.5            | 0.0      |
| I                           | 29,500                | 15              | 107                                 | 13.6                                     | 258.5                                 | 258.5                              | 258.5            | 0.0      |
| J                           | 29,820                | 99              | 207                                 | 7.0                                      | 263.9                                 | 263.9                              | 263.9            | 0.0      |
| K                           | 30,188                | 85              | 253                                 | 5.7                                      | 270.4                                 | 270.4                              | 270.5            | 0.1      |
| L                           | 30,570                | 154             | 934                                 | 1.6                                      | 277.8                                 | 277.8                              | 277.9            | 0.1      |
| M                           | 30,905                | 225             | 1,263                               | 1.2                                      | 278.9                                 | 278.9                              | 279.0            | 0.1      |
| N                           | 31,410                | 88              | 419                                 | 2.1                                      | 281.4                                 | 281.4                              | 281.4            | 0.0      |
| O                           | 31,811                | 15              | 102                                 | 4.7                                      | 282.3                                 | 282.3                              | 282.3            | 0.0      |
| P                           | 32,341                | 20              | 52                                  | 9.2                                      | 285.6                                 | 285.6                              | 285.6            | 0.0      |
| Q                           | 32,991                | 24              | 79                                  | 6.1                                      | 291.5                                 | 291.5                              | 291.7            | 0.2      |
| R                           | 33,488                | 22              | 90                                  | 5.3                                      | 299.0                                 | 299.0                              | 299.0            | 0.0      |
| S                           | 33,903                | 97              | 308                                 | 1.6                                      | 304.9                                 | 304.9                              | 304.9            | 0.0      |
| T                           | 34,359                | 27              | 108                                 | 2.8                                      | 307.5                                 | 307.5                              | 307.5            | 0.0      |
| U                           | 34,941                | 25              | 74                                  | 4.1                                      | 308.0                                 | 308.0                              | 308.0            | 0.0      |
| V                           | 35,283                | 32              | 101                                 | 3.0                                      | 310.0                                 | 310.0                              | 310.0            | 0.0      |
| W                           | 35,523                | 31              | 111                                 | 2.7                                      | 310.3                                 | 310.3                              | 310.3            | 0.0      |
| X                           | 35,791                | 45              | 114                                 | 2.6                                      | 312.4                                 | 312.4                              | 312.4            | 0.2      |
| Y                           | 36,271                | 13              | 44                                  | 6.8                                      | 314.4                                 | 314.4                              | 314.0            | 0.2      |

<sup>1</sup>Feet above confluence with Passaic River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY  
TOWNSHIP OF MONTCLAIR, NJ  
(ESSEX CO.)

FLOODWAY DATA

SECOND RIVER

| FLOODING SOURCE       |          | FLOODWAY        |                                     |                                          | BASE FLOOD<br>WATER SURFACE ELEVATION |                                    |                  |          |
|-----------------------|----------|-----------------|-------------------------------------|------------------------------------------|---------------------------------------|------------------------------------|------------------|----------|
| CROSS SECTION         | DISTANCE | WIDTH<br>(FEET) | SECTION<br>AREA<br>(SQUARE<br>FEET) | MEAN<br>VELOCITY<br>(FEET PER<br>SECOND) | REGULATORY                            | WITHOUT<br>FLOODWAY<br>(FEET NGVD) | WITH<br>FLOODWAY | INCREASE |
| <b>Nishuane Brook</b> |          |                 |                                     |                                          |                                       |                                    |                  |          |
| A                     | 3,465    | 118             | 357                                 | 3.4                                      | 170.3                                 | 170.3                              | 170.5            | 0.2      |
| B                     | 4,075    | 26              | 105                                 | 11.5                                     | 175.1                                 | 175.1                              | 175.1            | 0.0      |
| C                     | 4,815    | 46              | 277                                 | 4.4                                      | 191.8                                 | 191.8                              | 191.8            | 0.0      |
| D                     | 5,280    | 70              | 180                                 | 6.7                                      | 195.4                                 | 195.4                              | 195.4            | 0.0      |
| E                     | 4,857    | 116             | 329                                 | 3.7                                      | 208.5                                 | 208.5                              | 208.7            | 0.2      |
| F                     | 6,521    | 99              | 210                                 | 5.8                                      | 218.7                                 | 218.7                              | 218.7            | 0.0      |
| G                     | 6,685    | 150             | 410                                 | 3.0                                      | 220.6                                 | 220.6                              | 220.7            | 0.1      |
| H                     | 6,695    | 150             | 429                                 | 2.8                                      | 221.0                                 | 221.0                              | 221.0            | 0.0      |
| I                     | 7,300    | 182             | 361                                 | 3.4                                      | 234.4                                 | 234.4                              | 234.4            | 0.0      |
| J                     | 7,580    | 45              | 169                                 | 7.2                                      | 236.8                                 | 236.8                              | 236.8            | 0.0      |
| K                     | 8,245    | 142             | 414                                 | 1.6                                      | 247.3                                 | 247.3                              | 247.5            | 0.2      |
| L                     | 8,799    | 71              | 123                                 | 5.5                                      | 255.5                                 | 255.5                              | 255.6            | 0.1      |
| M                     | 9,136    | 78              | 157                                 | 4.3                                      | 261.3                                 | 261.3                              | 261.4            | 0.1      |
| N                     | 9,401    | 79              | 186                                 | 3.7                                      | 264.5                                 | 264.5                              | 264.7            | 0.2      |
| <b>Yantacaw Brook</b> |          |                 |                                     |                                          |                                       |                                    |                  |          |
| A                     | 20       | 12              | 50                                  | 9.5                                      | 175.1                                 | 175.1                              | 175.3            | 0.2      |
| B                     | 463      | 20              | 61                                  | 7.8                                      | 181.8                                 | 181.8                              | 181.8            | 0.0      |
| C                     | 763      | 69              | 284                                 | 1.7                                      | 186.8                                 | 186.8                              | 186.9            | 0.1      |
| D                     | 1,438    | 6               | 42                                  | 11.3                                     | 198.8                                 | 198.8                              | 198.8            | 0.0      |

<sup>1</sup>Feet above confluence with Second River Tributary<sup>2</sup>Feet above confluence with Third River

TABLE 2

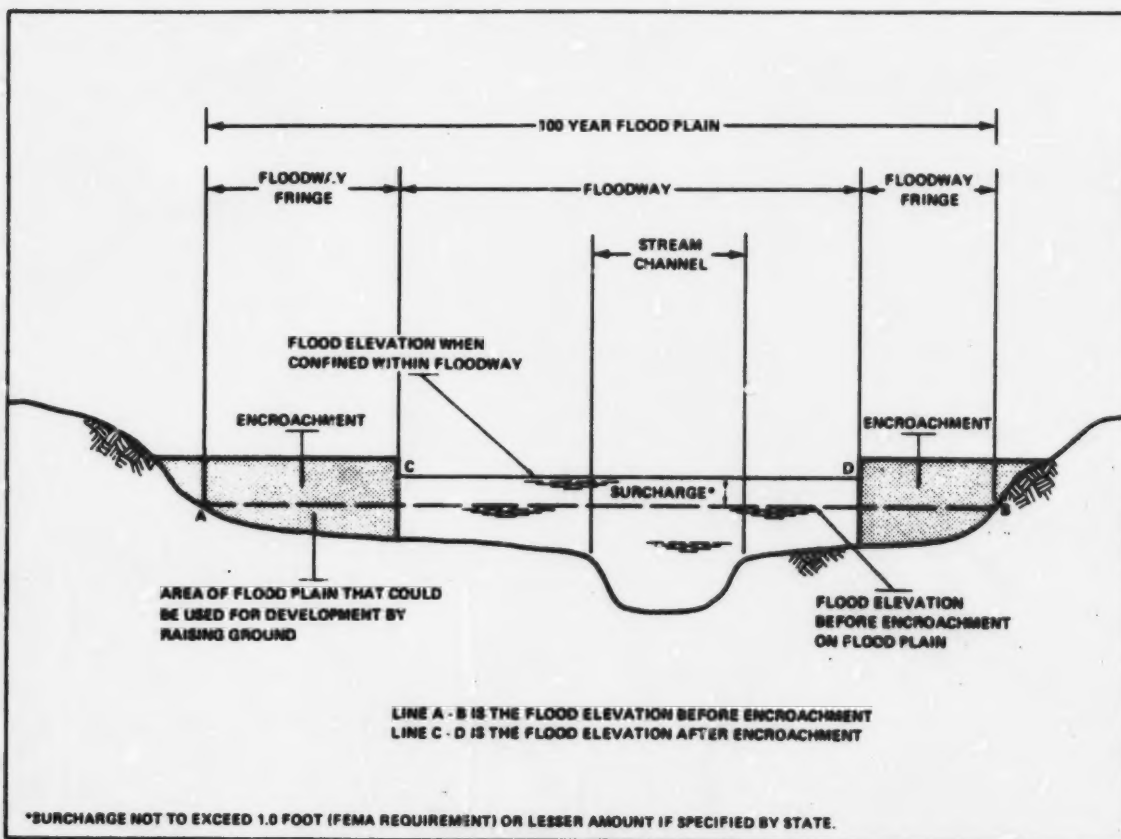
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TOWNSHIP OF MONTCLAIR, NJ  
(ESSEX CO.)

FLOODWAY DATA

NISHUANE BROOK - YANTACAW BROOK





FLOODWAY SCHEMATIC

Figure 9

#### Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

#### Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

#### Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

#### Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

#### Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

#### Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

#### Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

### 6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

#### 7.0 OTHER STUDIES

A Flood Insurance Study for the Town of Bloomfield is currently being prepared (Reference 6). The results of that study will be in exact agreement with the results of this study.

Flood Insurance Studies for the City of Clifton, the Township of Glen Ridge Borough, and the Town of West Orange have been published (References 7, 8, and 9). Due to the more up-to-date hydrologic and hydraulic analyses used in this study, flood boundaries for these communities are not in agreement. Flood elevations in the West Orange study are also not in agreement.

#### 8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

#### 9.0 BIBLIOGRAPHY AND REFERENCES

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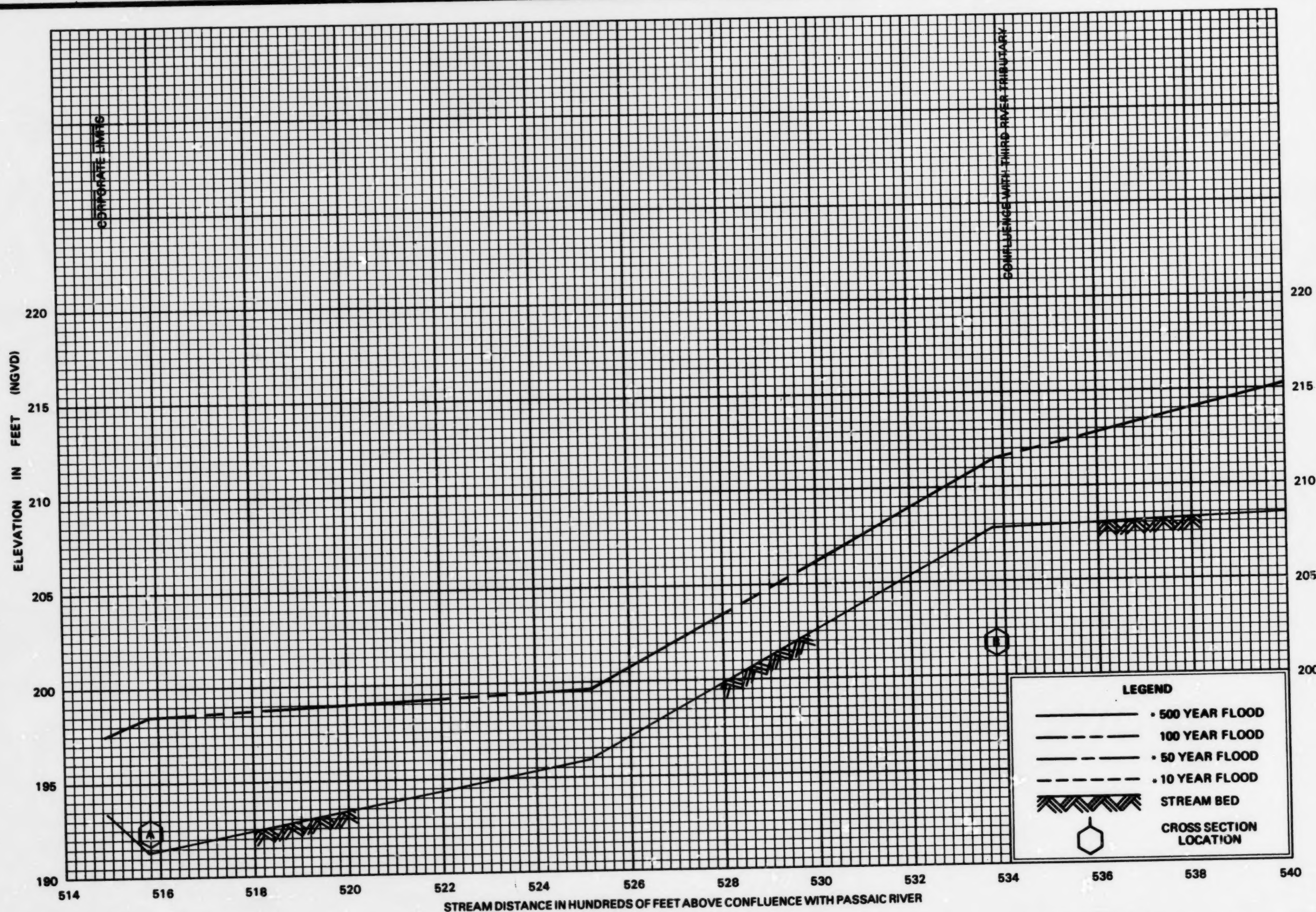
State of New Jersey, Department of Environmental Protection, Division of Water Resources, Resolution RE: Floodway delineation adopted by the Water Policy and Supply Council on October 30, 1974, New Jersey.



**EXHIBIT 3 - ELEVATION REFERENCE MARKS**

| <u>Reference<br/>Mark</u> | <u>Elevation<br/>(Feet NGVD)</u> | <u>Description of Location</u>                                                                |
|---------------------------|----------------------------------|-----------------------------------------------------------------------------------------------|
| RM 1                      | 165.28                           | Southeast corner catch basin head in front of no. 445 Orange Road.                            |
| RM 2                      | 177.60                           | PK in pole no. PS73 Rosedale Avenue and Pleasant Way.                                         |
| RM 3                      | 209.90                           | T of traverse on hydrant, corner of Willowdale Avenue and Linden Avenue.                      |
| RM 4                      | 262.04                           | Y of Kennedy on hydrant, corner of High Street and Orange Road.                               |
| RM 5                      | 203.22                           | Southeast corner of west wing wall, south of Bloomfield Avenue.                               |
| RM 6                      | 244.65                           | U. S. Geological Survey mark no. 3610, northwest corner Grove Street and Glen Ridge Avenue.   |
| RM 7                      | 263.11                           | U. S. Geological Survey mark no. 3623, northwest corner Forest Street and Friendship Place.   |
| RM 8                      | 296.95                           | U. S. Geological Survey mark no. 3624, northwest corner Chestnut Street and Park Street.      |
| RM 9                      | 307.55                           | U. S. Geological Survey monument no. 6616, south side of Valley Road, east of Central Avenue. |

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\*DATA NOT COMPUTED

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FLOOD PROFILES

THIRD RIVER

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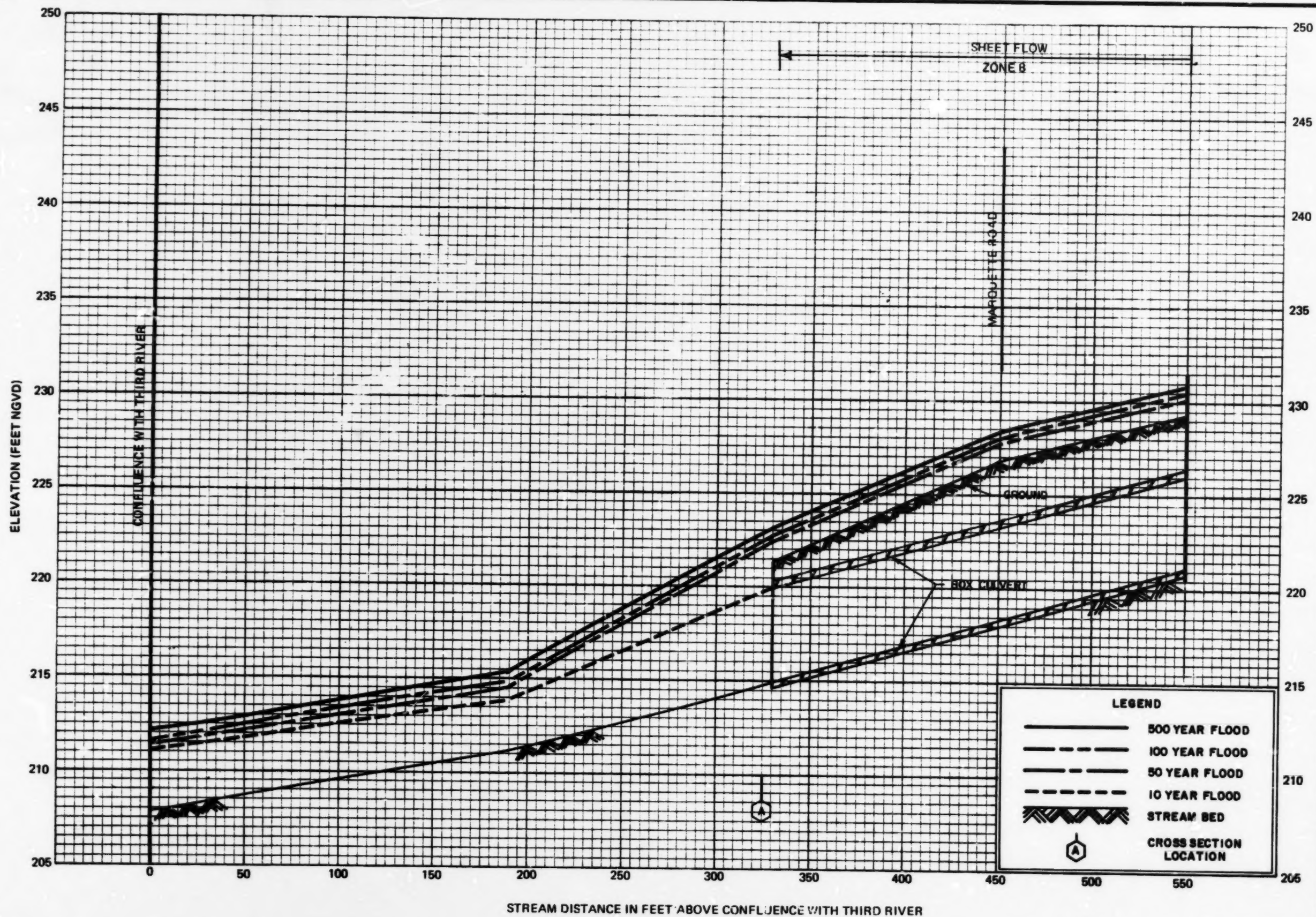
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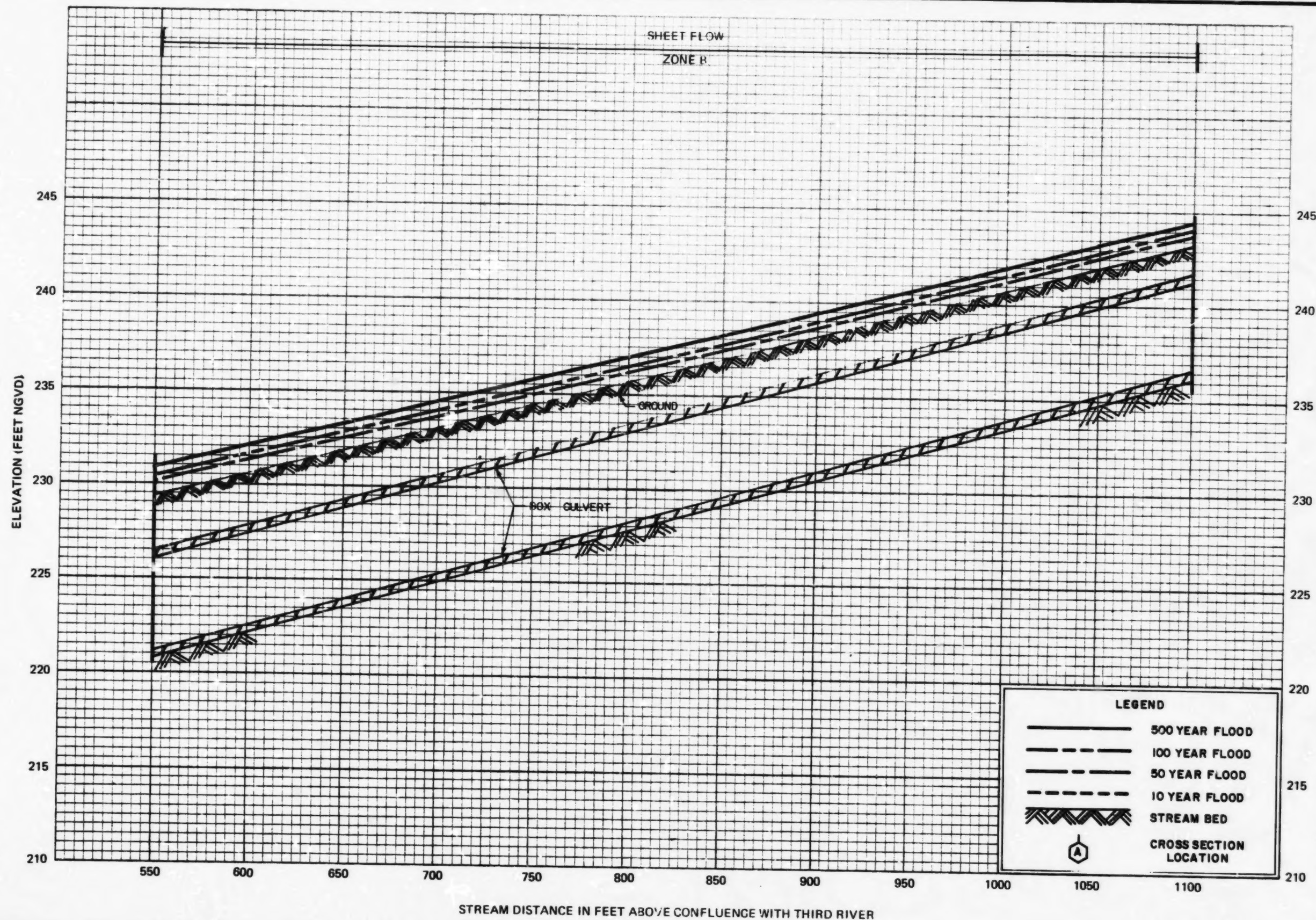
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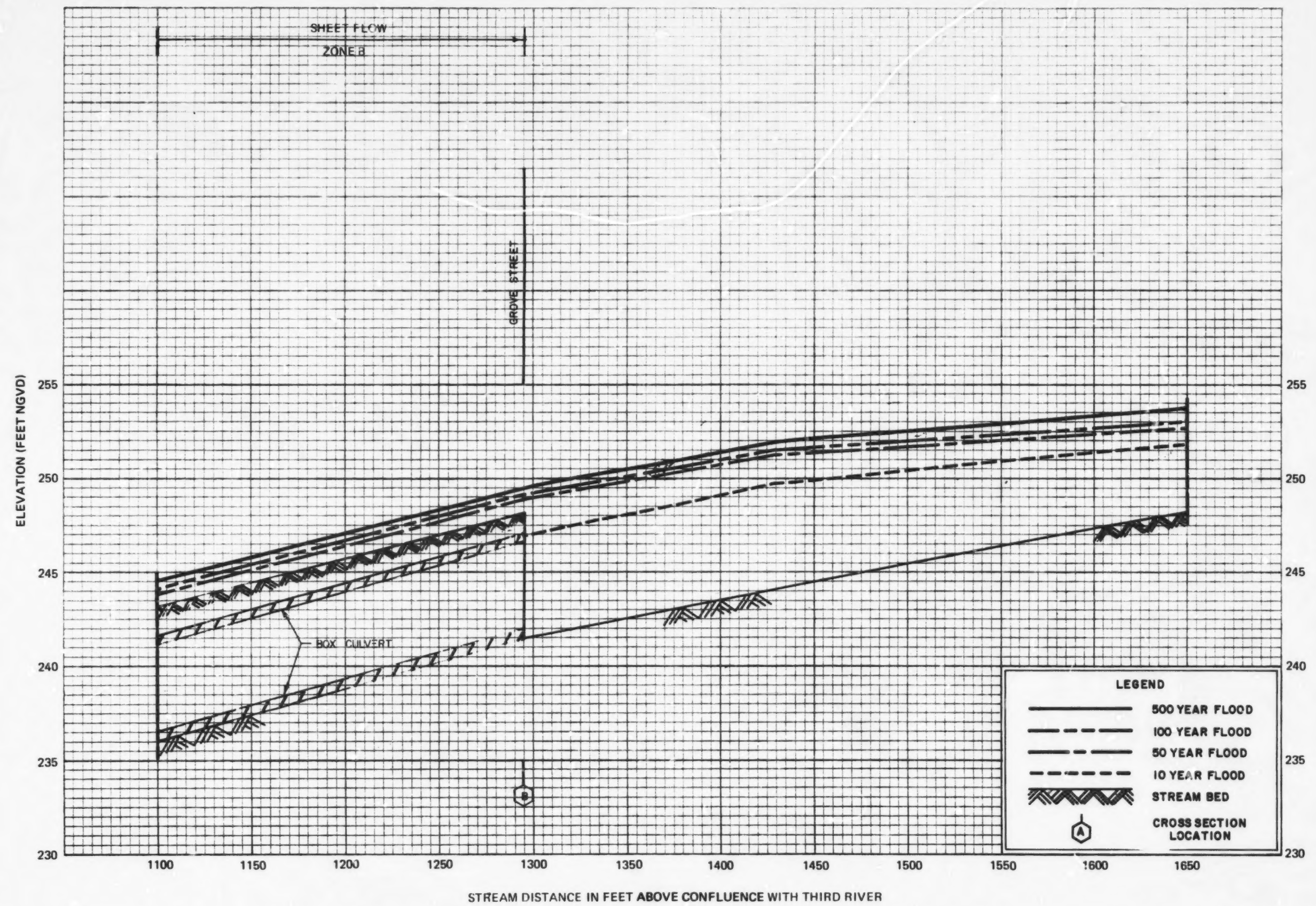
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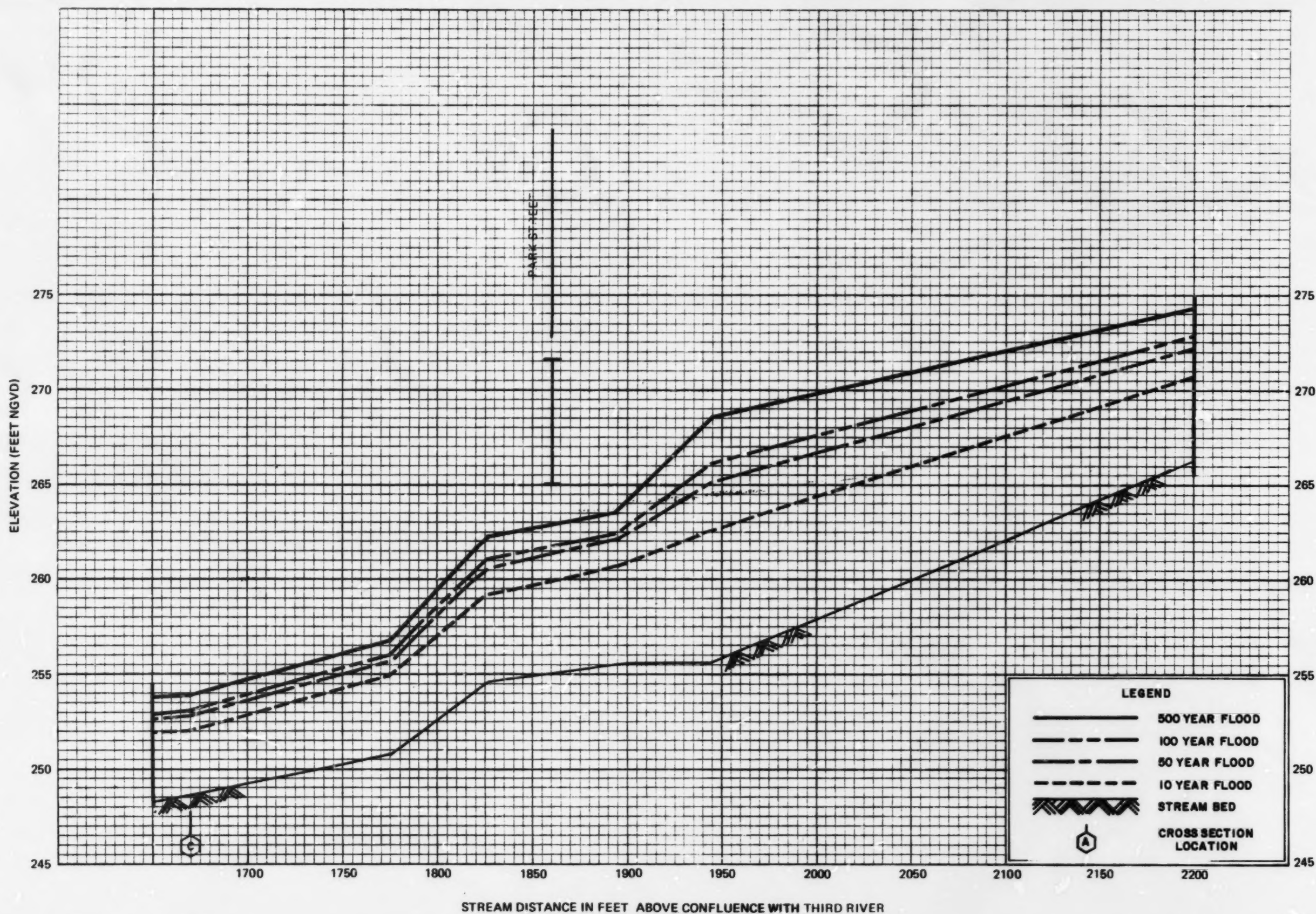
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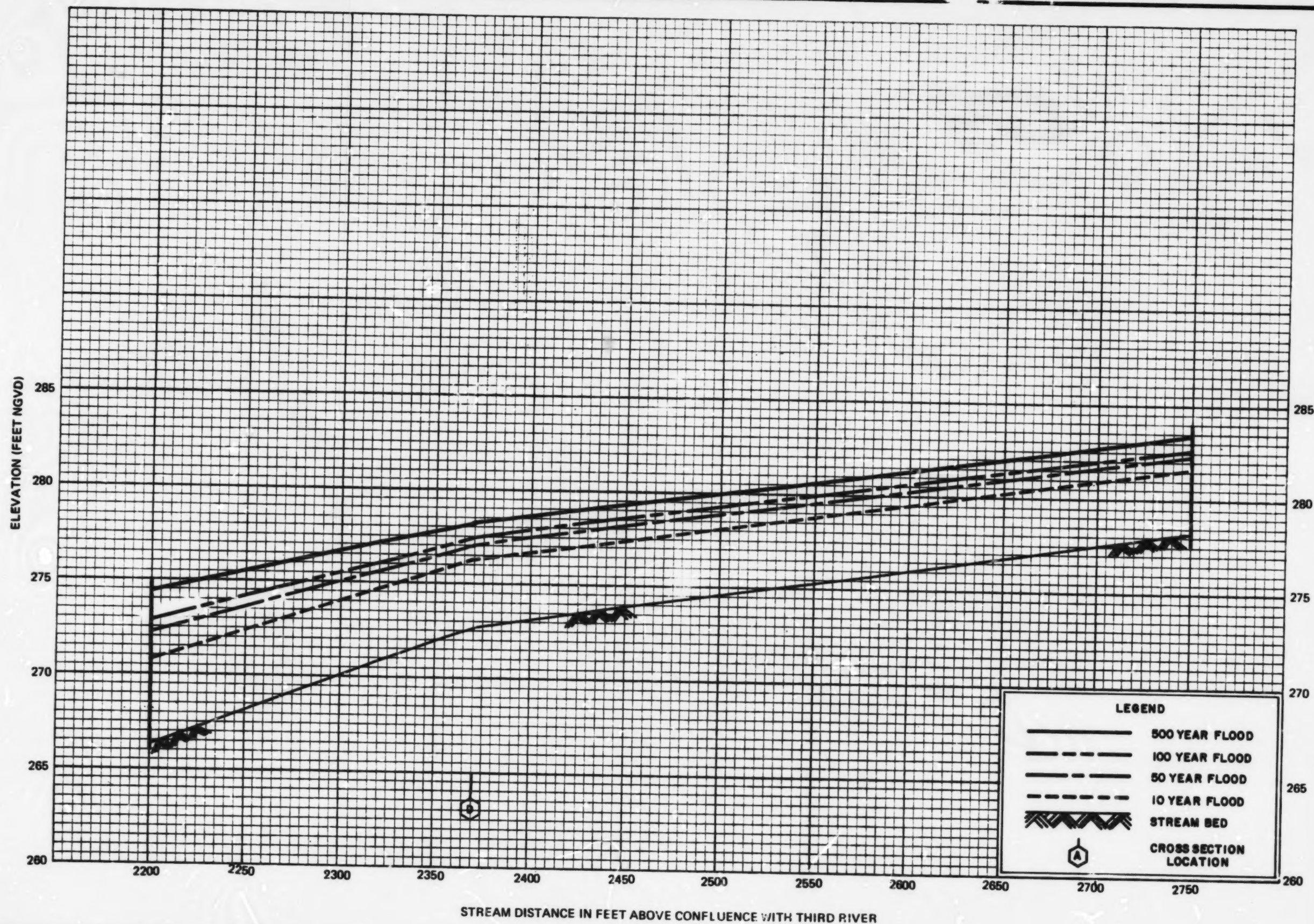
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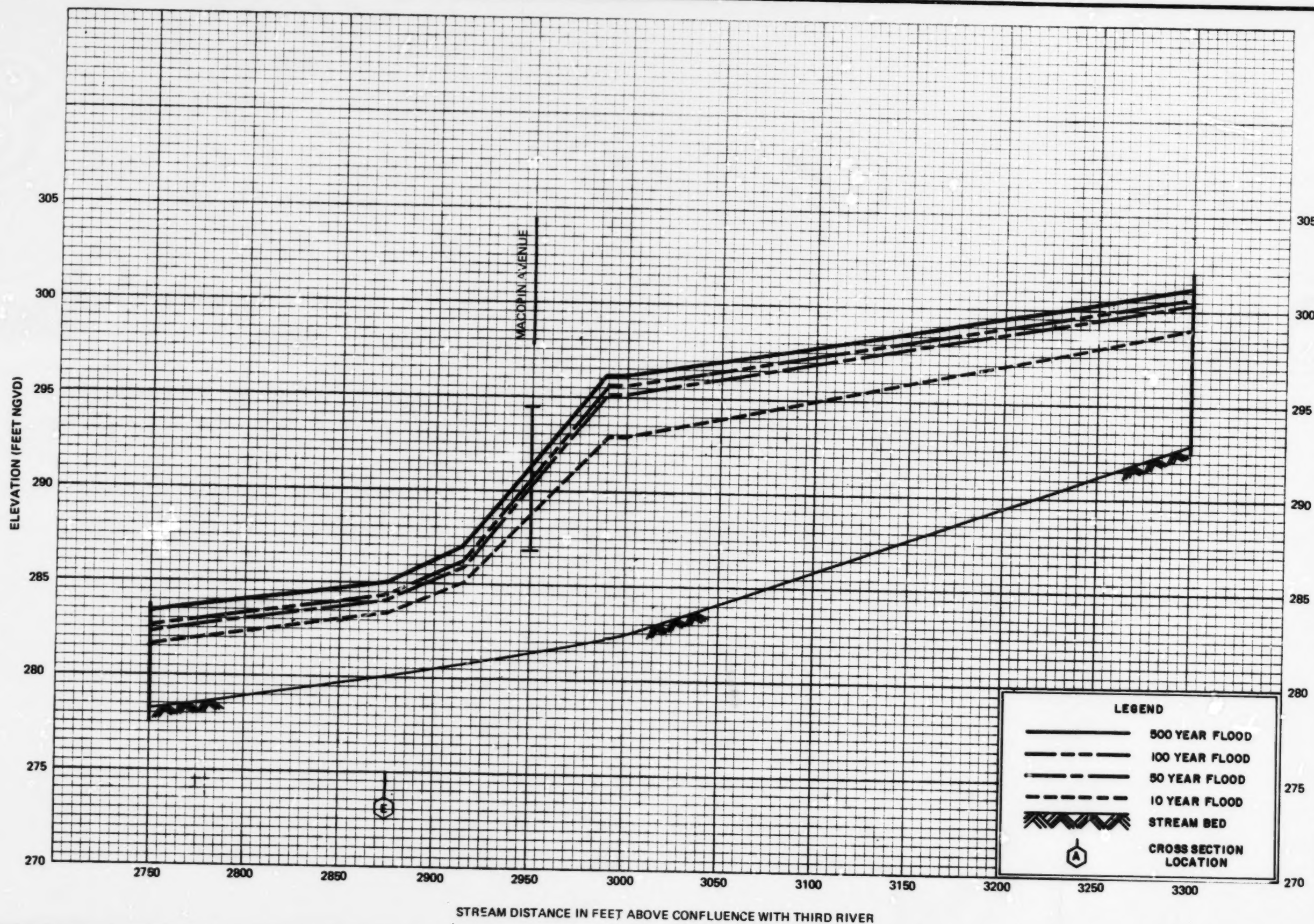
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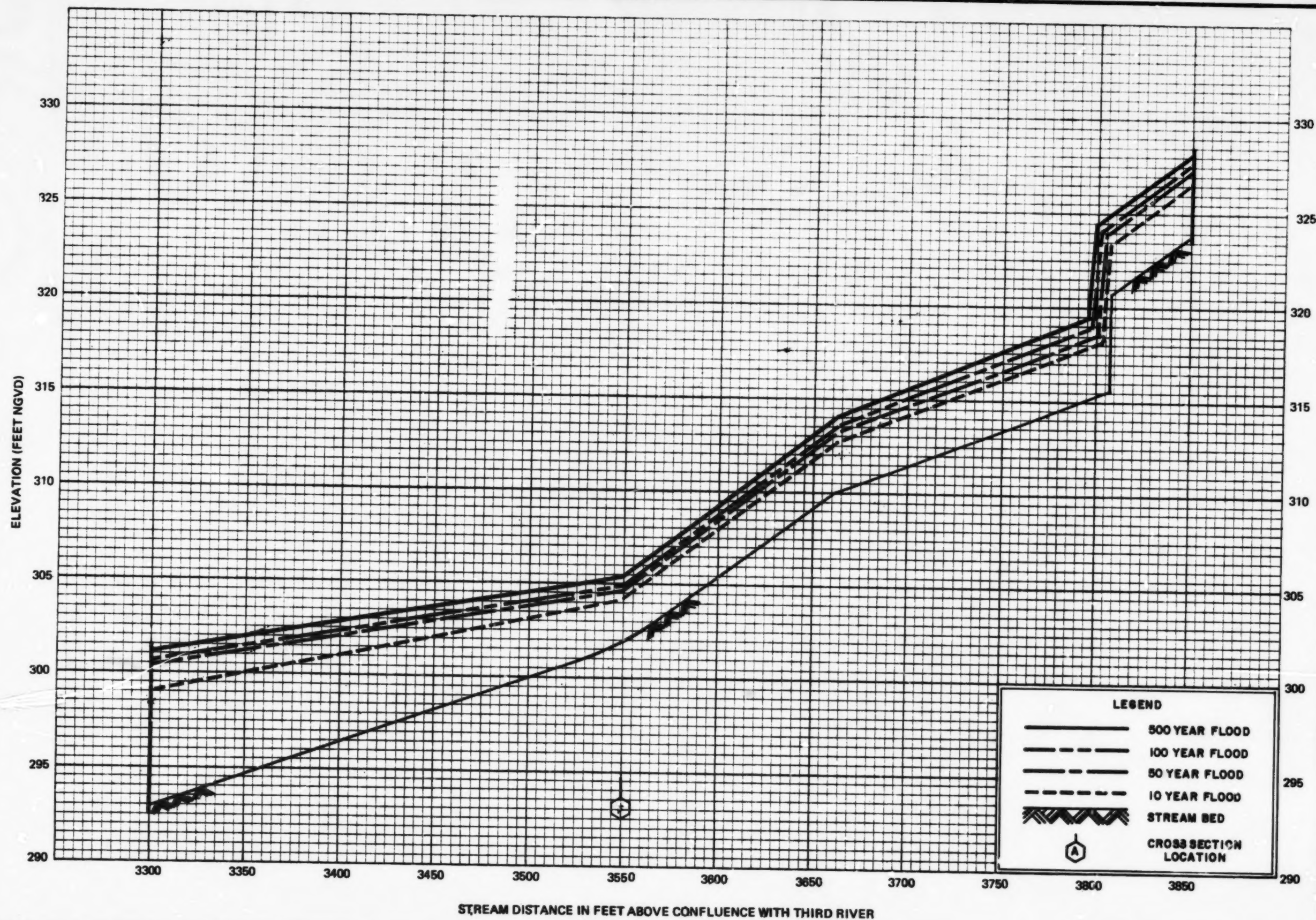
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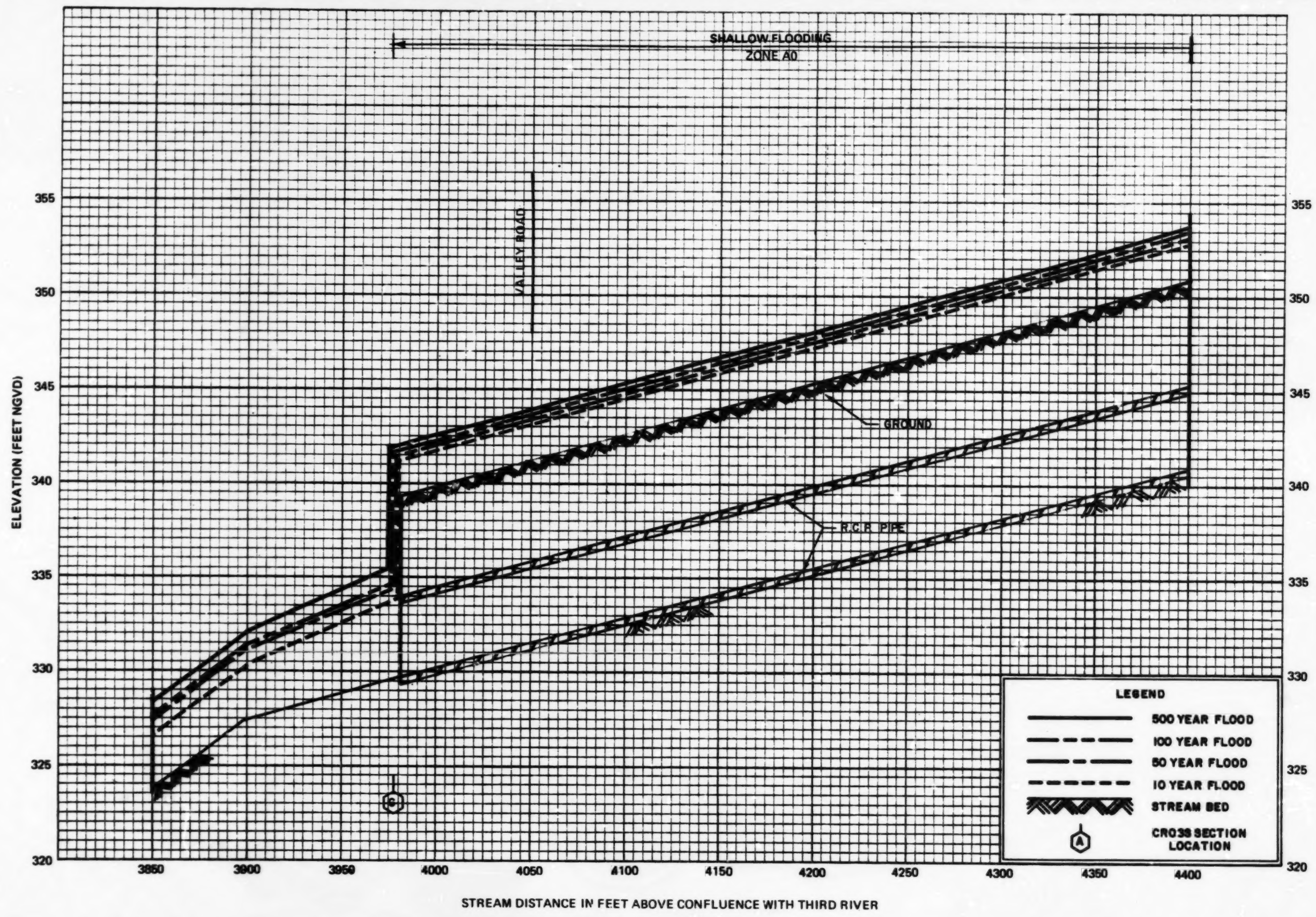
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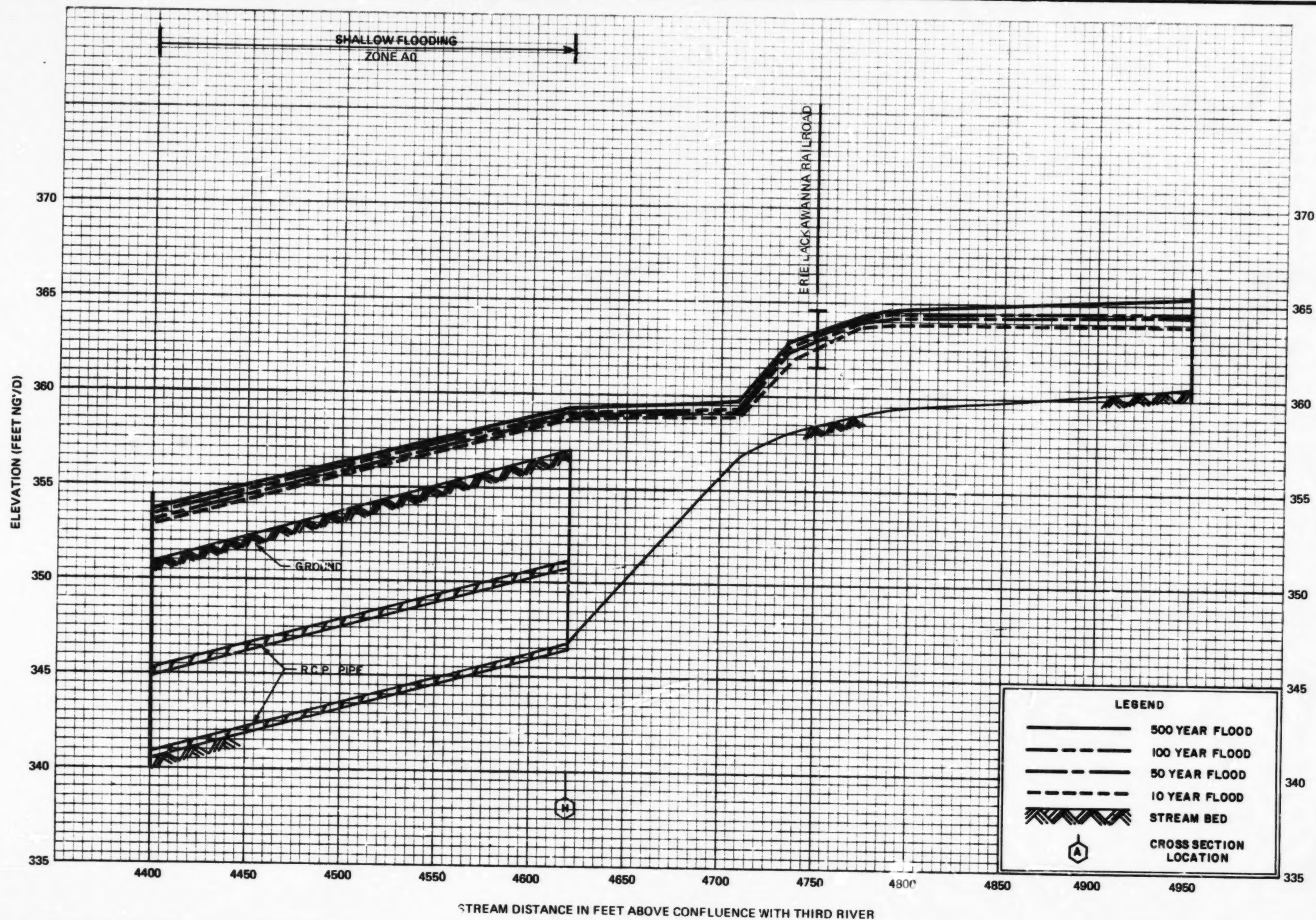


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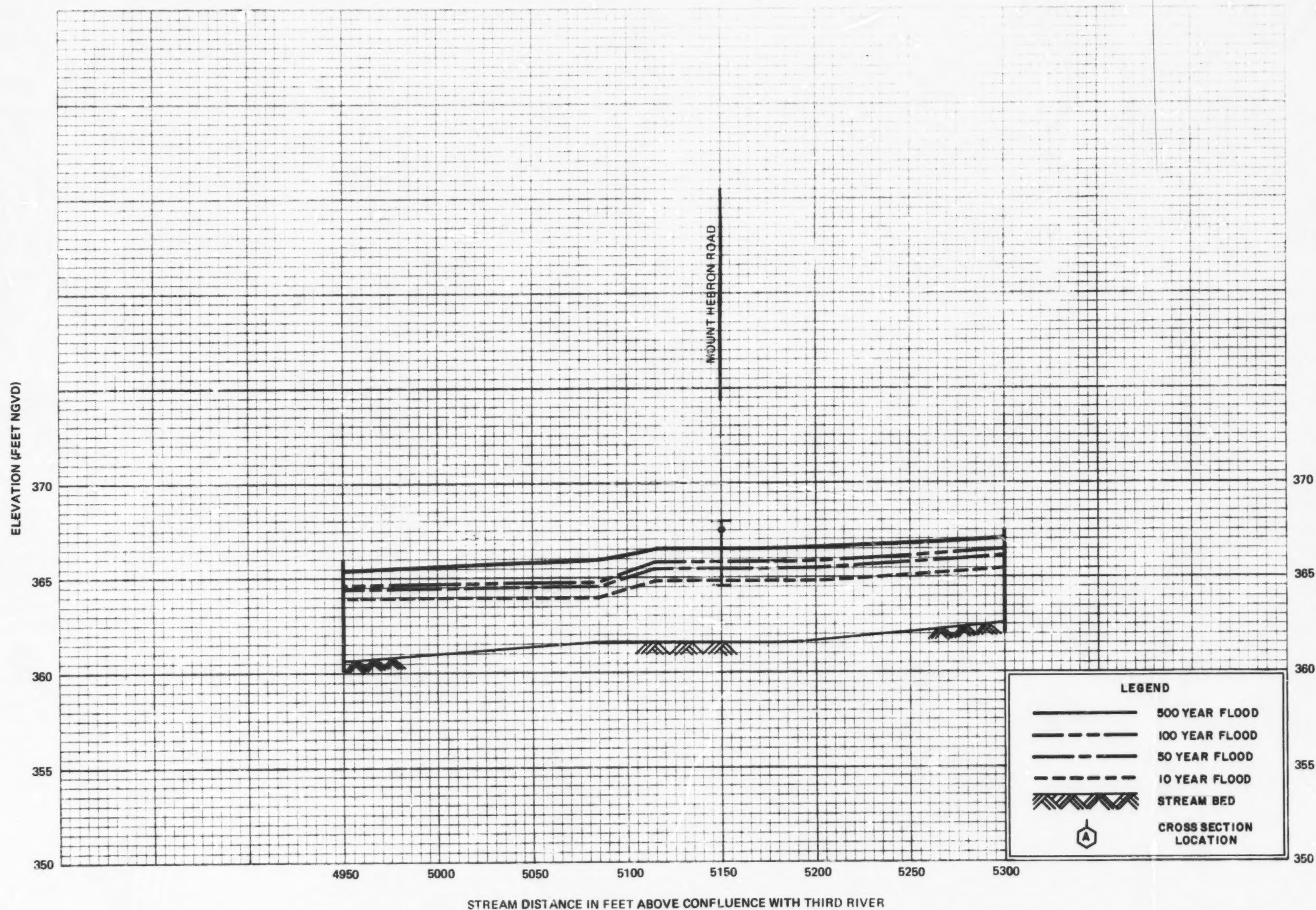
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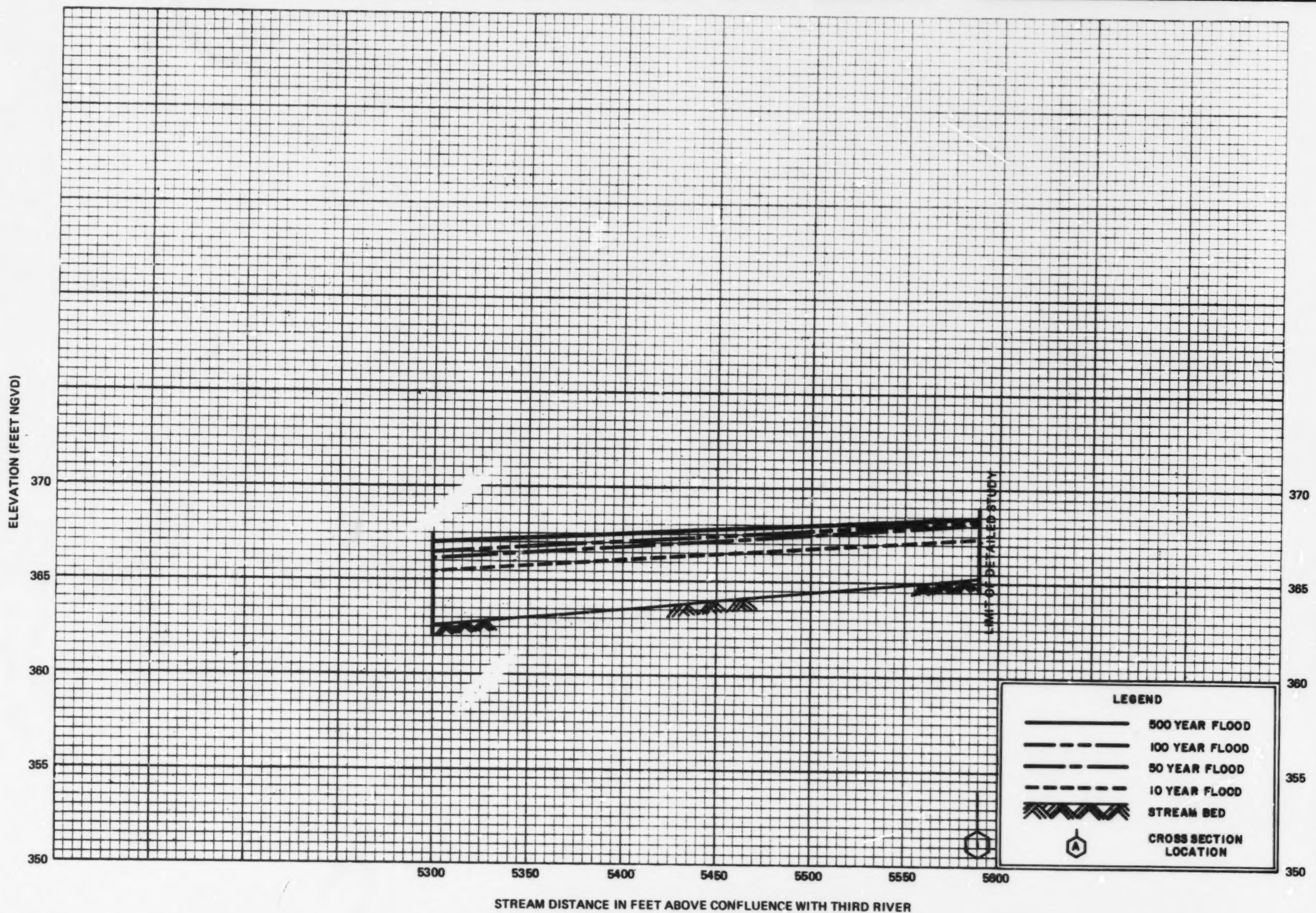


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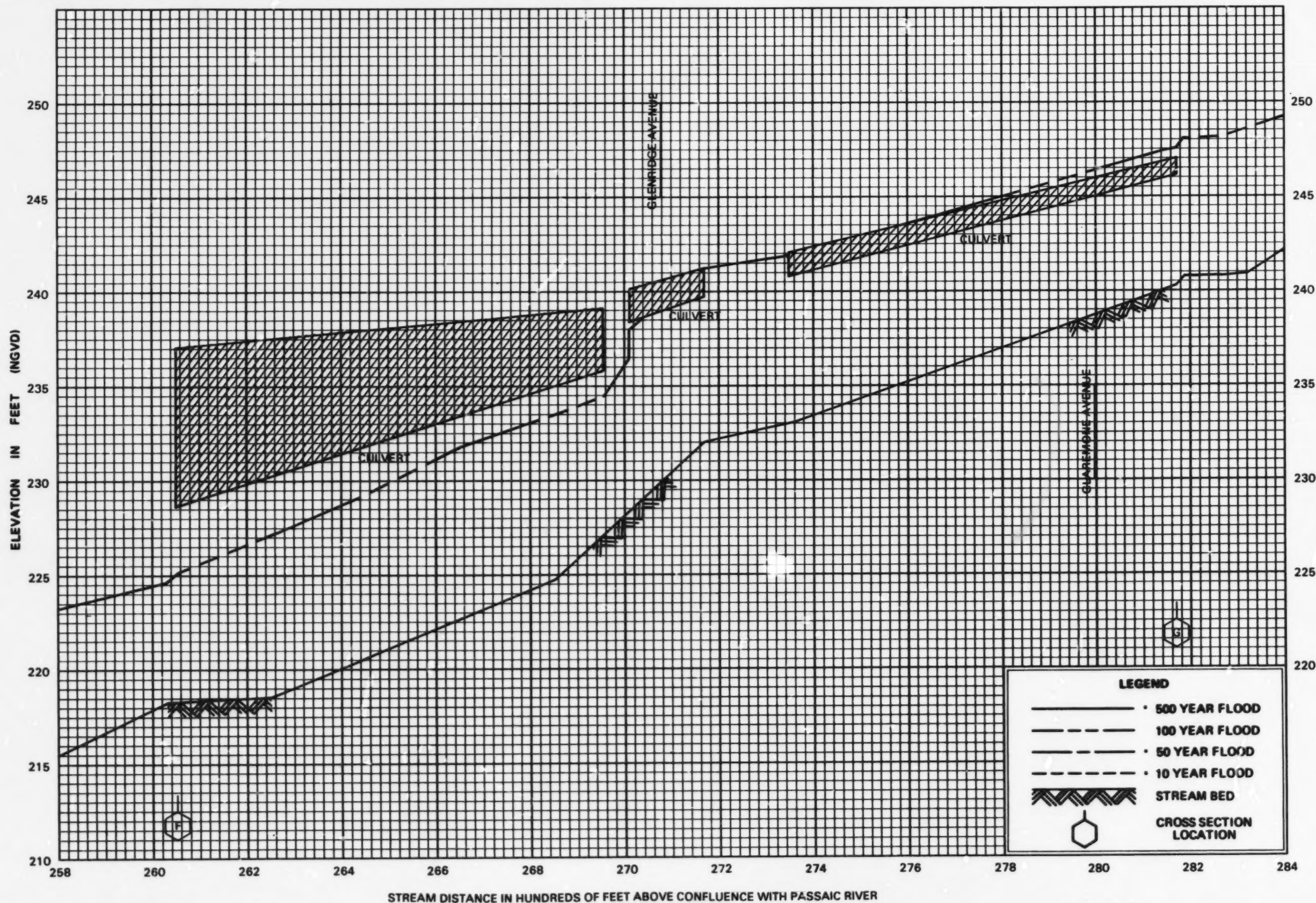
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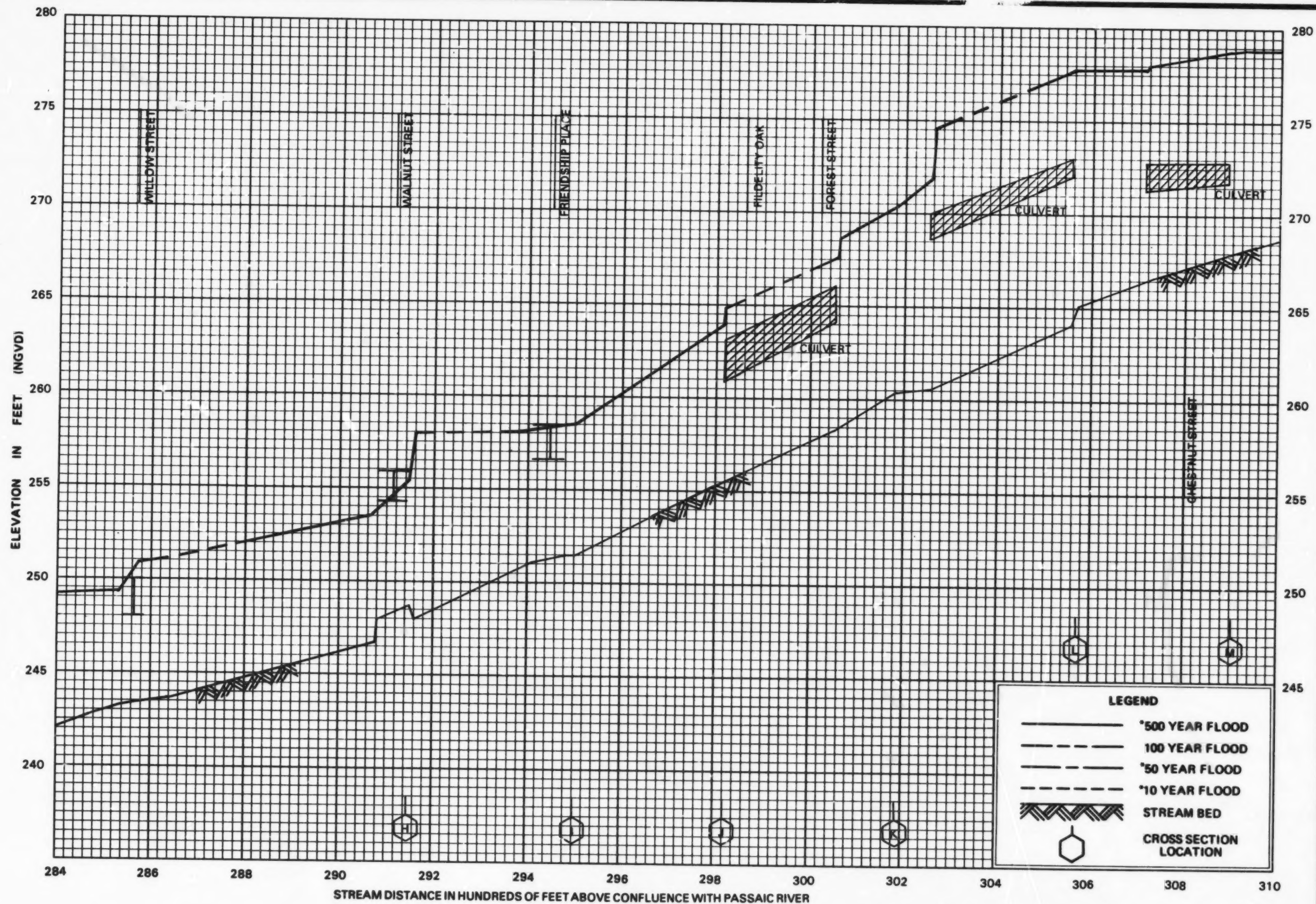
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SECOND RIVER

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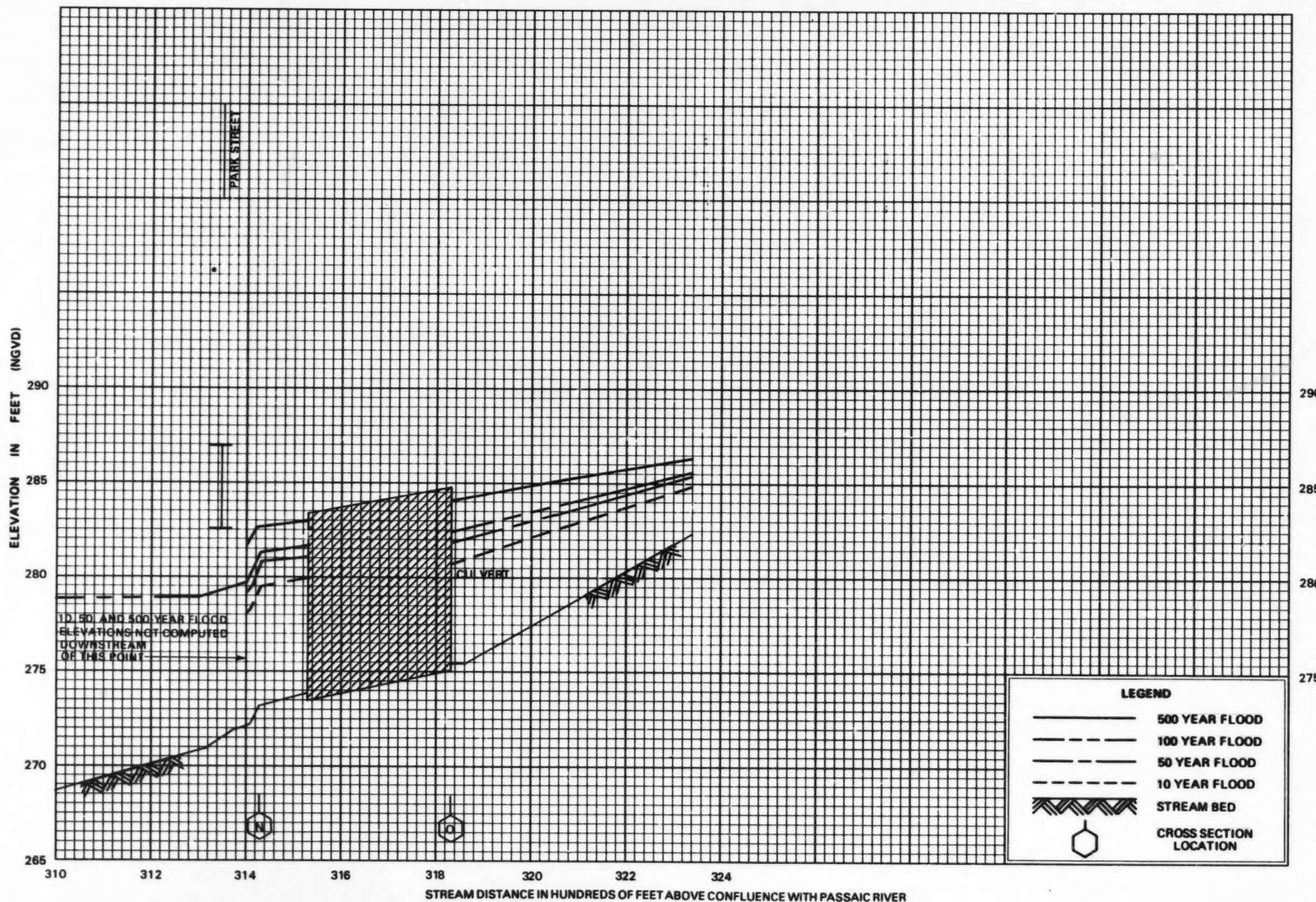
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## SECOND RIVER

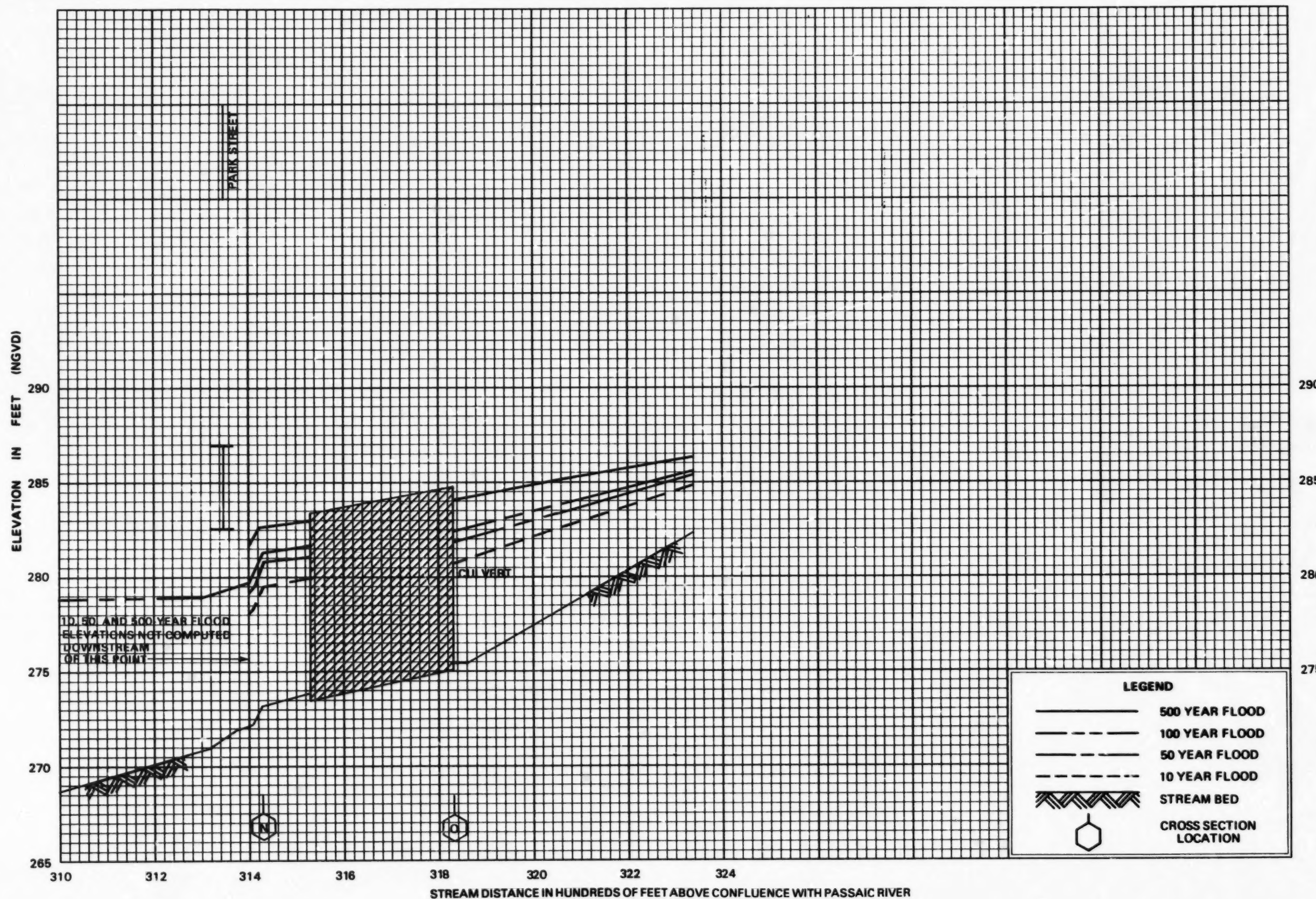
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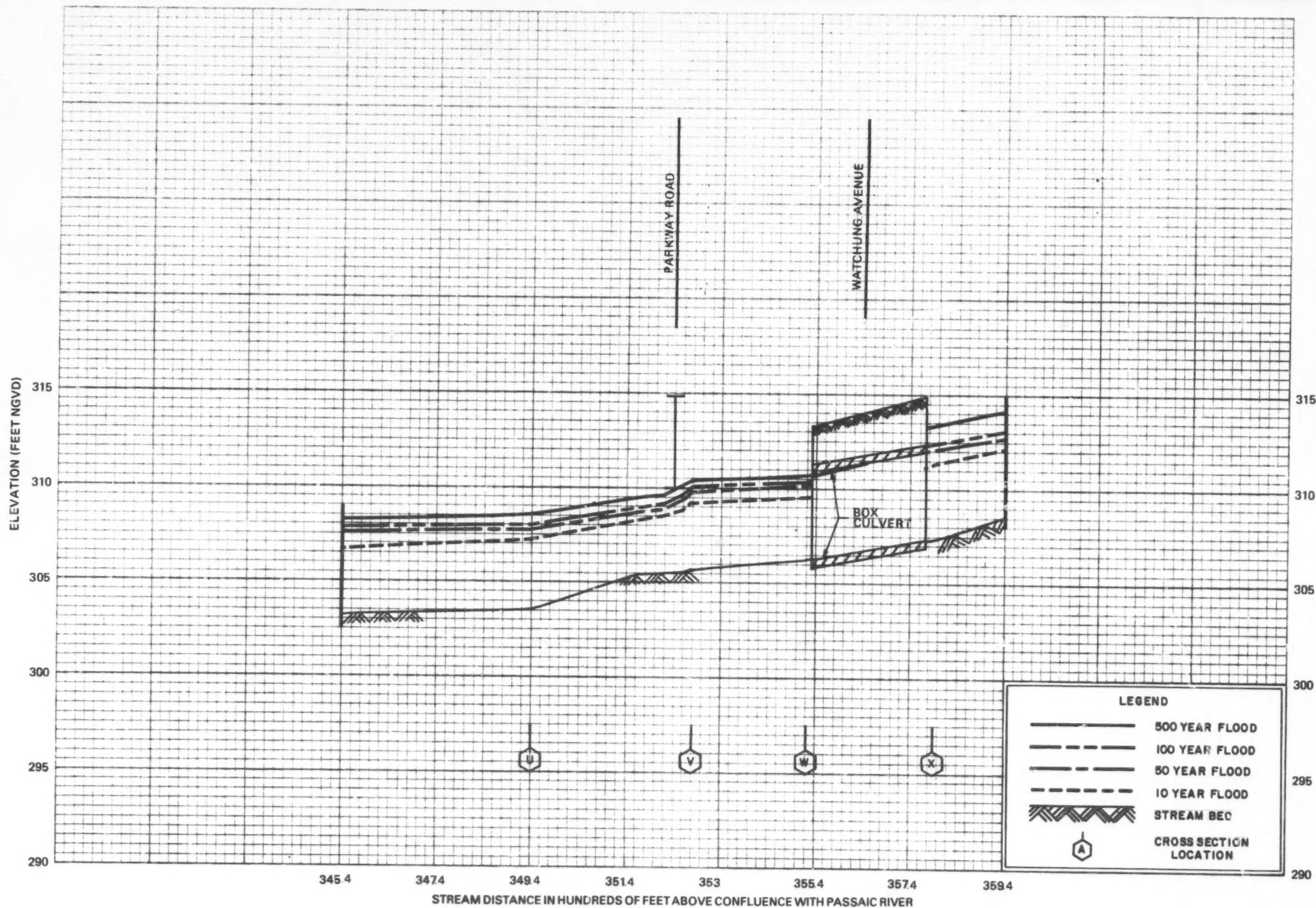
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## SECOND RIVER

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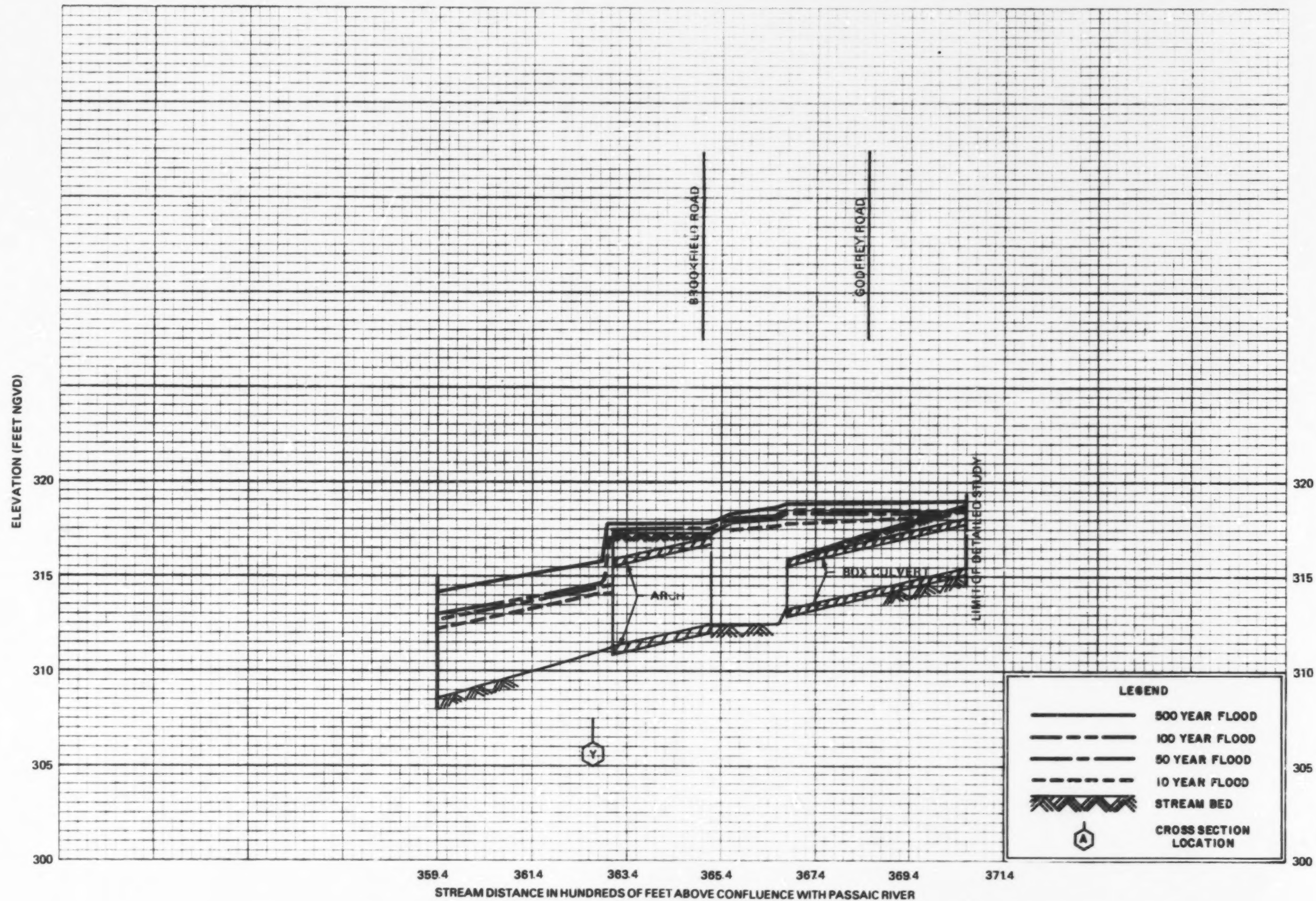
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## **SECOND RIVER**

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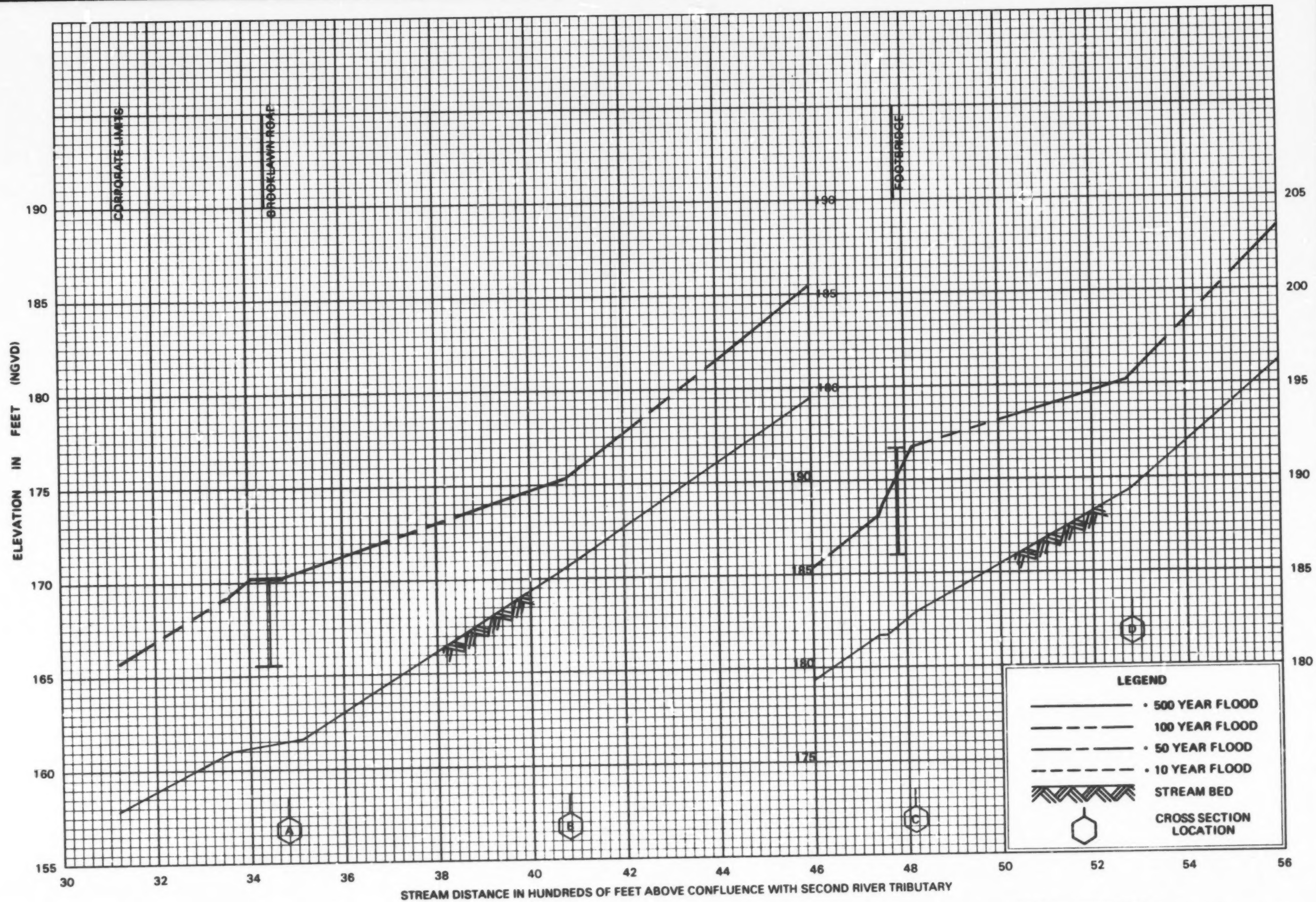
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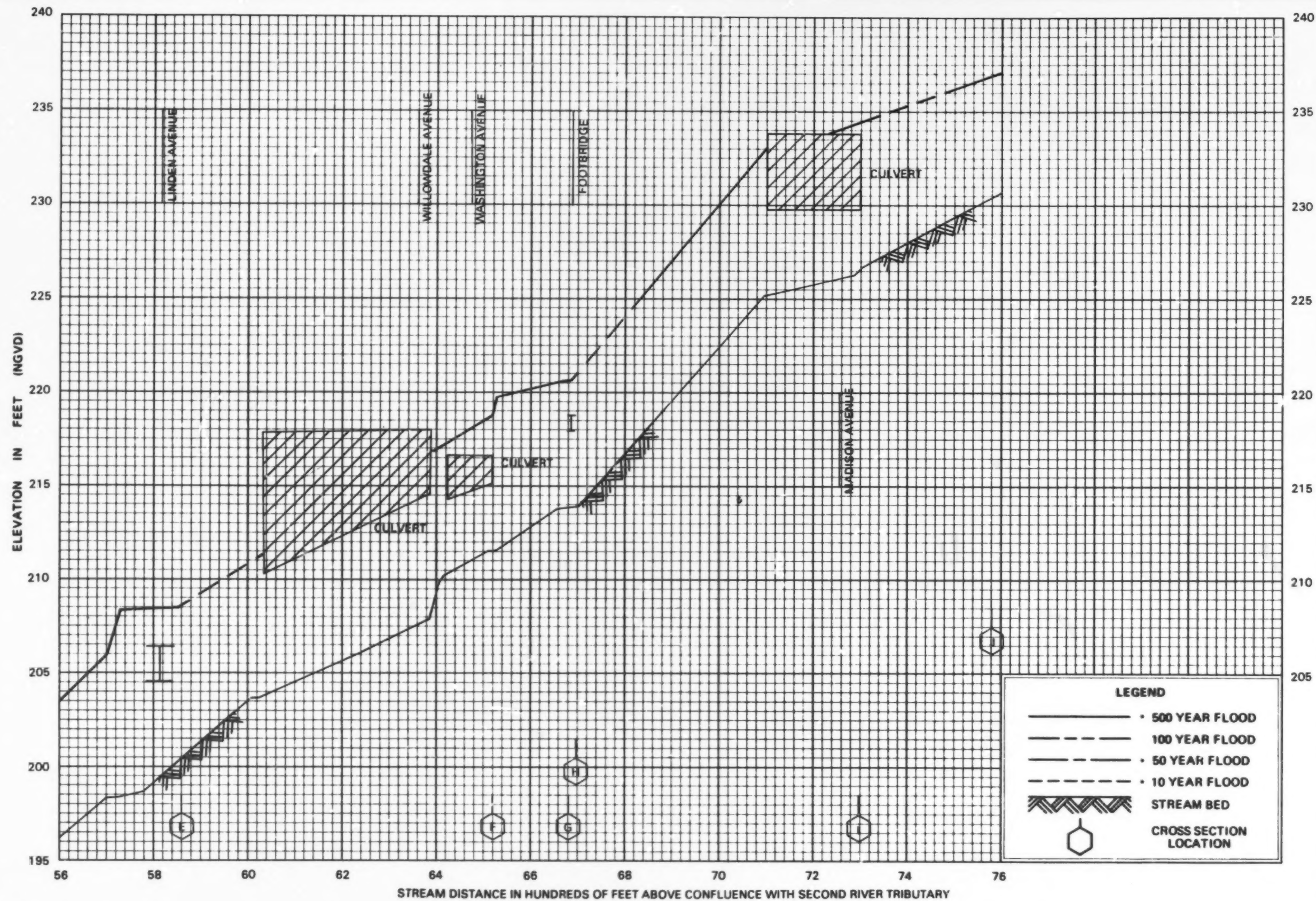
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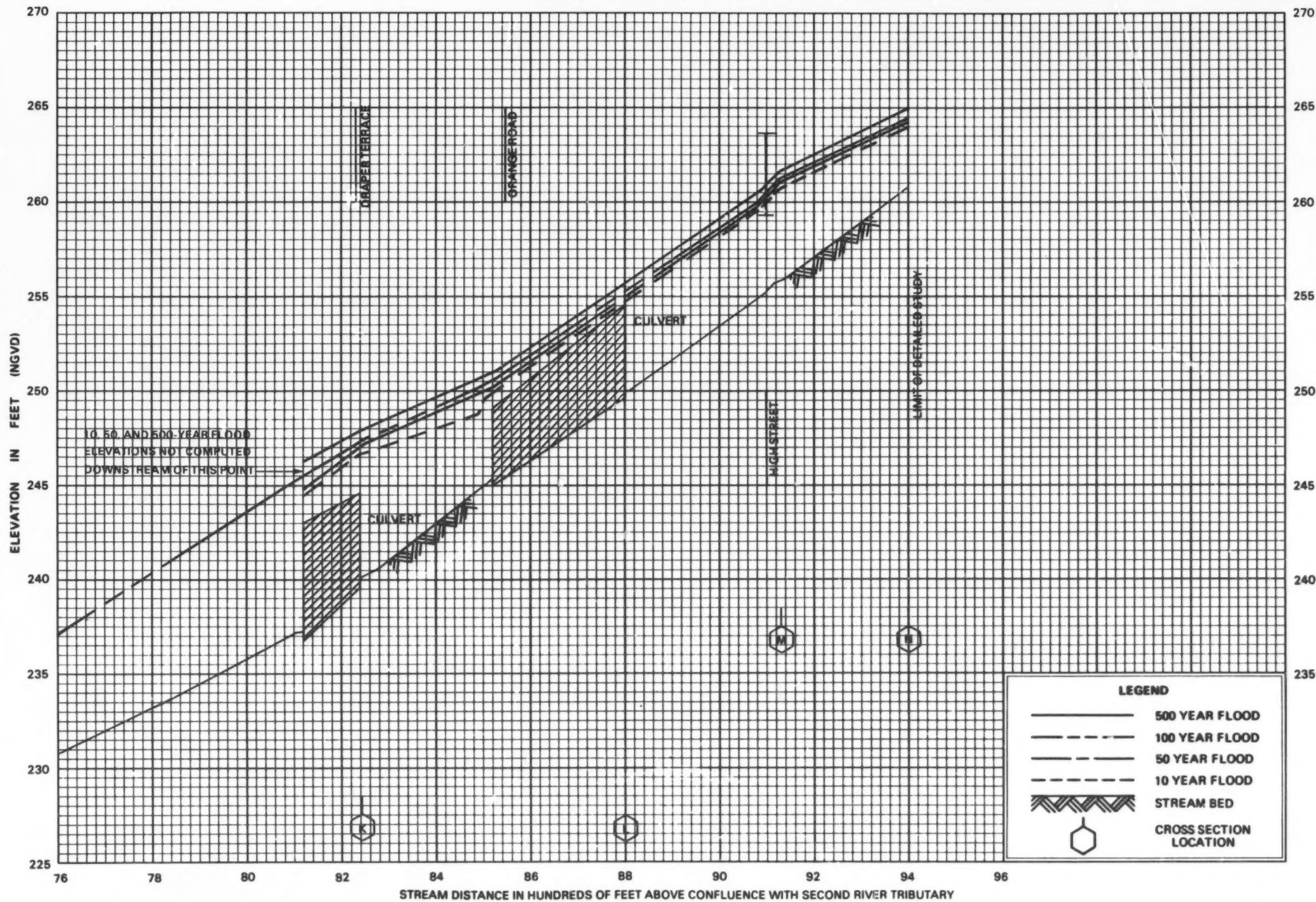
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NISHUANE BROOK

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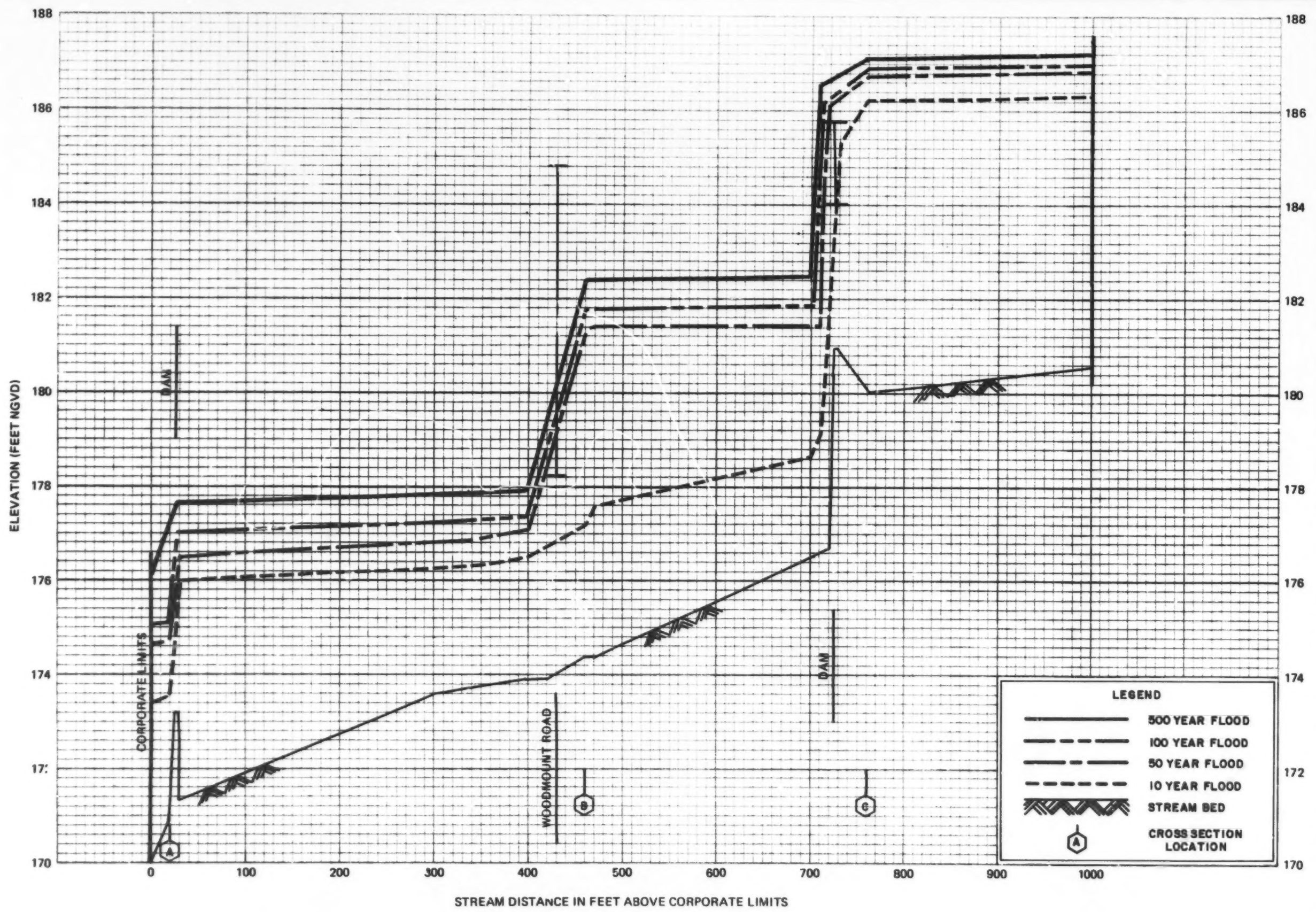
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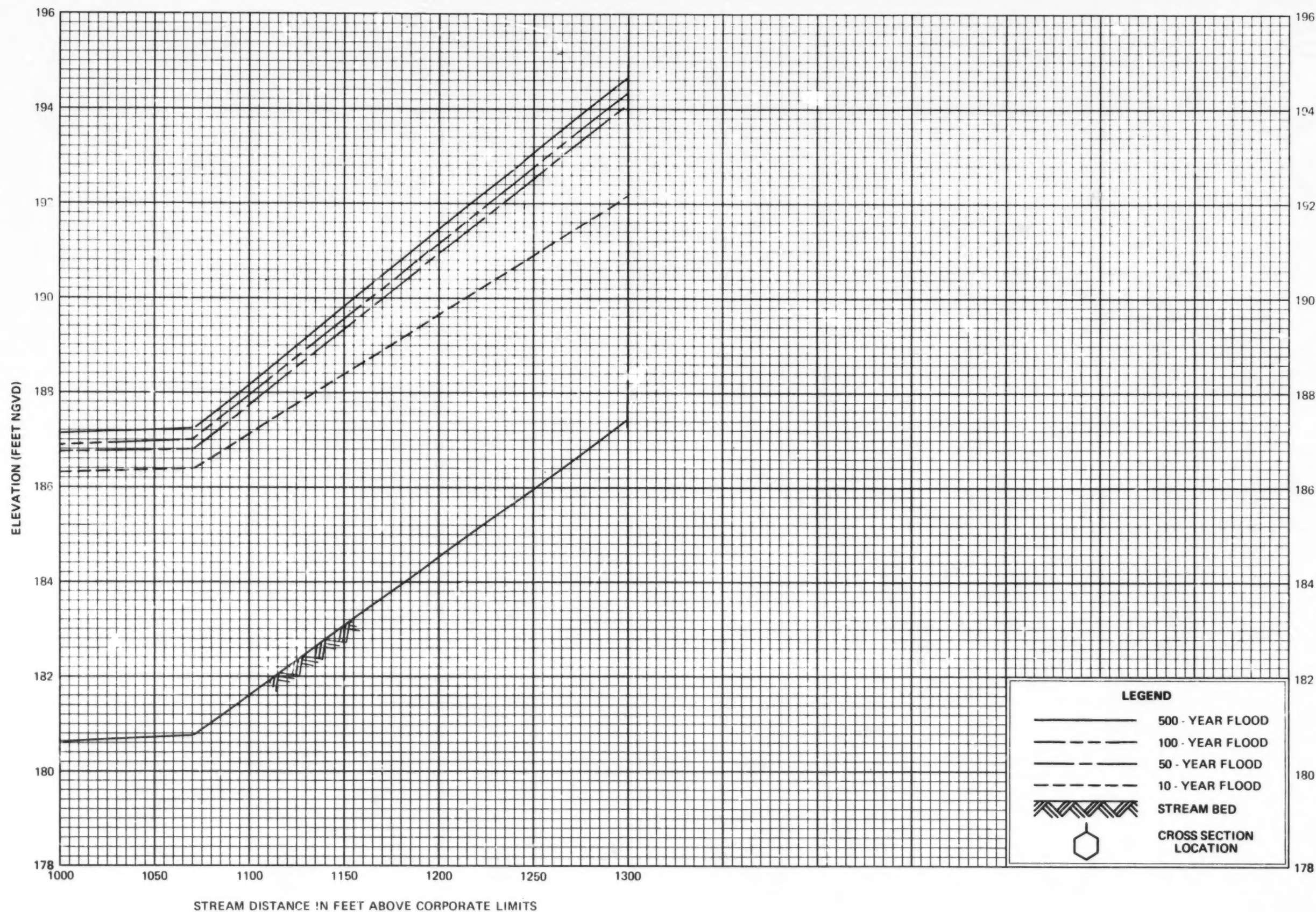
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FEDERAL EMERGENCY MANAGEMENT AGENCY  
**TOWNSHIP OF MONTCLAIR, NJ**  
(ESSEX CO.)



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# FLOOD PROFILES

YANTACAW BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MONTCLAIR, NJ

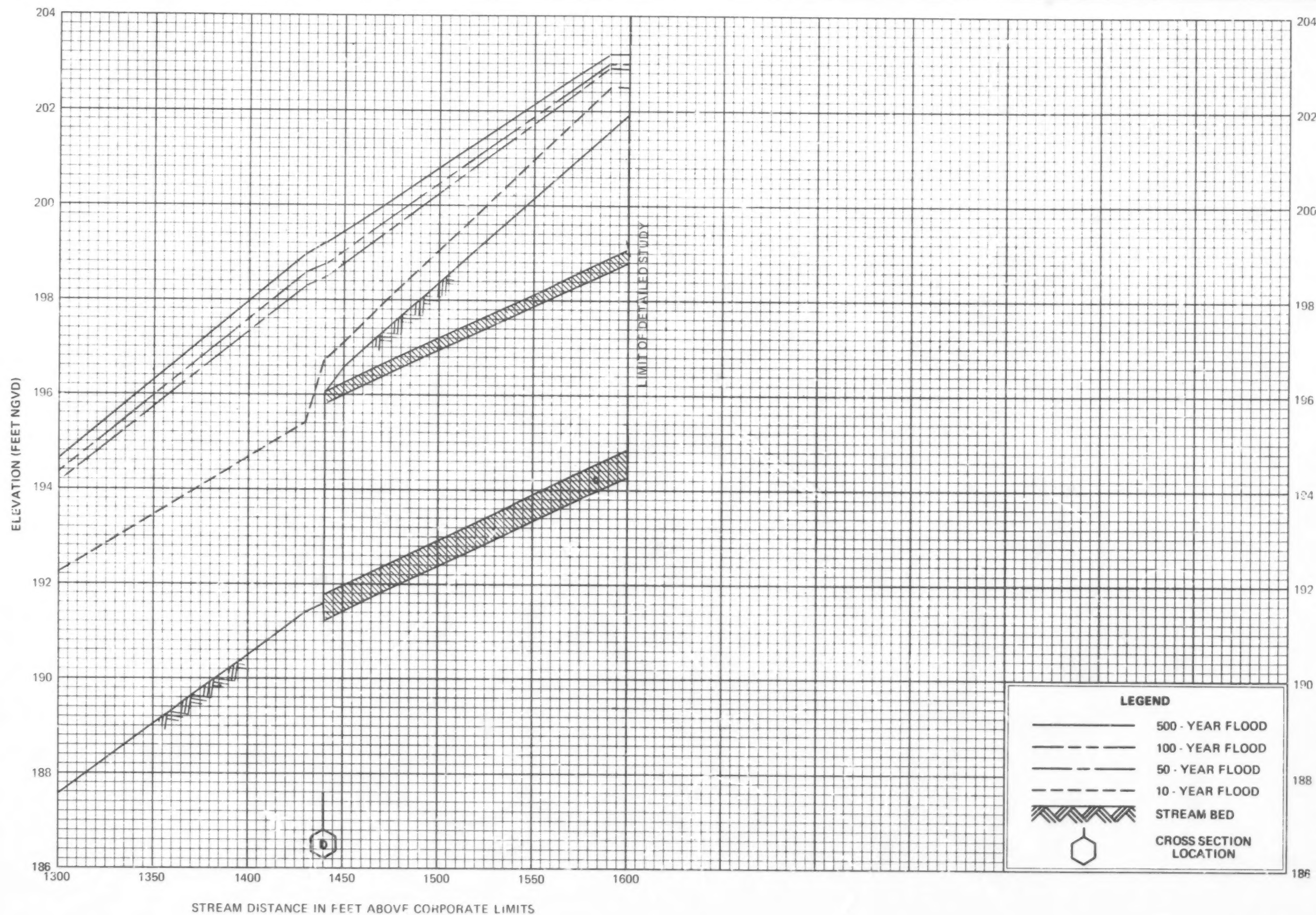
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# FLOOD PROFILES

YANTACAW BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF MONTCLAIR, NJ

(ESSEX CO.)

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